

TECHNICAL NOTES

U S Department of Agriculture

Natural Resources Conservation Service

TN - PLANT MATERIALS - 40

March 1996

A VEGETATIVE GUIDE TO SELECTED NATIVE GRASSES OF CALIFORNIA

by

Gene Bishop

Assistant Manager
Lockeford Plant Materials Center
U.S. Department of Agriculture
Natural Resources Conservation Service
Lockeford, California
209-727-3205

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INTRODUCTION

This guide is an effort to provide information on selected California native grasses; growth characteristics, geographical location, physical location, and seed Data. The descriptions are based on current knowledge of the natural occurring range of native grass species. This does not infer that a species can not survive outside these geographic and physical locations or that they do not naturally occur outside these locations. Our knowledge of native species is limited and continually being revised as data is developed.

The selection of species was based on the commercial availability of seed or the potential availability of seed. The information presented has been developed from several sources and is the authors best interpretation of the data. In order to develop this guide, it was necessary to place the data in a format utilized by the Natural Resources Conservation Service, USDA. Each species sheet includes a description of the grass species, the Major Land Resource Areas (MLRA) with 4ETA in which the species may be found, a brief description of the MLRA and 4ETA, and seed Data. Data from specimen cards for specimens found at the University of California, Davis, Herbarium is also included for each species.

The geographic subdivisions of California, as presented in the "Jepson Manual 1993", were interpreted and adjusted to fit the Major Land Resource Areas (MLRA) with 4ETA zones. Although these systems are very similar, they do not match perfectly and there may be a discrepancy in a species geographic location. It should also be noted that plants are unable to read maps and may be found outside a described geographic location as a result of nature. In order to determine the geographic limitations of a species, it is necessary to understand the physical location requirements of a species. To accomplish this, it is important to **carefully read** the species description as well as to identify the appropriate MLRA. Although a species may be identified as being found in a particular MLRA, the physical location may limit it to a small portion of that MLRA; i.e. around or in a meadow or along a streambank, found on dry rocky slopes, etc. The species description may also included some geographic limitations which should be considered; i.e. found in the Coast Range from Santa Barbara County to Lake County. Local knowledge of plant communities should also be taken into consideration when using this guide.

SEEDING RATE

Native grass seed is very expensive and will probably not be applied according to standards established for introduced or naturalized grass species. It is not likely that a single species will be recommend as a method of application; i.e. 12 pounds of California fescue at a cost of \$105.00 a pound: \$1260.00 an acre. It is more likely that a recommendation for a mixture including several species will be made to insure early growth and provide erosion control. This mixture may

include perennial native grass species for long term erosion control and or meet the revegetative need of the project. With this in mind, the following seeding system is presented.

Seeding rates are based on **PURE-LIVE-SEED** (PLS) and the number of seeds per square foot. It is recommended that a minimum of 25 seeds per square foot be used for revegetation projects and a maximum of 50 seeds per square foot be used for critical area plantings. In order to provide the decision maker the maximum amount of flexibility; the seed data for each species is presented as the number of seeds per square foot based on one pound per acre. The number of seeds per pound is also presented in this guide. This will allow the decision makers to create their own seed mixtures based on a total of 25 to 50 seed per square foot. With a little simple division, a seed mixture can be created for a specific location.

It will be the responsibility of the decision makers to determine which species are to be used in the seed mix and how many seed per square foot of each species is desired. These decisions will be based on the type of project, the geographic location, the physical location and the desired results.

If the seed mixture is for a critical area, the pounds of each species might be something like this:

EXAMPLE

Blando brome	= 251,840 seeds per pound:	5.78 seeds per square foot
Purple stipa	= 109,749 seeds per pound:	2.50 seeds per square foot
Idaho fescue	= 450,000 seeds per pound:	10.33 seeds per square foot
Blue wildrye	= 134,900 seeds per pound:	3.11 seeds per square foot

Tech. Note TN - Plant Materials - 5, February 1975, will provide data on introduced species (refer to bibliography).

Seed mixture

3.5 # Blando brome = 20 seeds

2.0 # Purple stipa = 5 seeds

2.0 # Idaho fescue = 21 seeds

1.5 # Blue wildrye = 5 seeds

Total 9.0 #/acre (PLS) * 51 seeds per sq. ft.

Pure-live-Seed required equals Desired seed per square foot
Seed per square foot of desired species

Blando brome: $\frac{20}{5.78}$ equals 3.5 pounds (PLS)

* Remember this is pure-live-seed, not bulk seed weight. The amount of seed required is based on purity and germ. The Quality of seed should be taken into consideration when making a purchase.

Pure-Live-Seed (PLS)

Tech. Note TN - Plant Materials - 34, March 1994, will supply data on the method to determine PLS (refer to bibliography)

$$\text{PLS} = \frac{\% \text{ germ} \times \% \text{ purity}}{100}$$

EXAMPLE

Blando brome:	Germ = 83.0%,	Purity = 97.1%*
Stipa pulchra:	Germ = 61.0% ,	Purity = 96.5%
Idaho fescue:	Germ = 65.0%,	Purity = 98.2%
Blue wildrye:	Germ = 95.0%,	Purity = 99.4%

Seed Mixture

Blando brome	=	4.3 #	
Stipa pulchra	=	3.4 #	
Idaho fescue	=	3.1 #	
Blue wildrye	=	<u>1.6 #</u>	
Total	=	12.4 #/acre	Seeding rate adjusted for PLS.

Purple stipa: $\frac{61.0 \times 96.5}{100} = 58.9\%$ $\frac{2.0\#}{.589} = 3.4$ pounds bulk seed weight

NRCS employees should review the California policy for using native species.

* This information can be found on the seed tag which comes with each bag of seed. It is the responsibility of the Seller to provide this information.

FAMILY
POACEAE

SPECIES DESCRIPTION AND HABITAT	MLRA 4ETa	4ETa inch	PRECIP inches	ELEVATION (feet)	Frost FREE DAYS	Seed Data
<p><u><i>Agrostis exarata</i></u> Bentgrass</p> <p>A relatively slender to stout, mostly tufted perennial grass, 20 to 120 cm tall. Often on rather moist soils, but in various habitats, perhaps best developed in the mountains and along the north coast. It is particularly abundant along streams in or about meadows. Common along the seacoast. It is utilized by grazing animals. Overgrazing will reduce the stand. May not withstand competition from other species over successive years. Found below 6550 Feet.</p> <p>Collect seed from July to August. May be earlier at lower elevations.</p>	4b	18-21	36-80	< 2625	250 - 300	<p><u>5,896,800*</u> seeds per pound</p> <p>1 lb/ac = <u>135</u> seeds per square foot</p>
	4c	15-18	23-80	mnt. 3937		
	5b	18-21	36-85	325-4600	60 - 250	
	5c	15-18	23-85	mnt. 8858		
	5d	12-15	12-68			
	14c	15-18	24-39	< 1975	210 - 300	
	14d	12-15	12-30			
	14e	9-12	9-30			
	15c	15-18	15-39	< 2625	120 - 270	
	15d	12-15	12-40	mnts.5577		
	15e	9-12	9-40			
	15f	6-9	6-15			
	16e	9-12	9-15	<sealevel		
	17d	12-15	12-25	< 650	230 - 350	
	17e	9-12	9-25			
	17f	6-9	6-15			
	18d	12-15	12-35	650-1650	200 - 320	
	18e	9-12	9-35	mnt. 3937		
	18f	6-9	6-15			
	19d	12-15	12-25	< 1975	250 - 365	
	19e	9-12	9-25			
	20d	12-15	12-40	1975-7875	100 - 200	
	20e	9-12	9-40	mnt.12139	<250	
	20f	6-9	6-15			
	22c	15-18	40-60	1650-7875	30 - 180	
	22d	12-15	12-60	mnt. 4100		
	22e	9-12	9-53			
	22f	6-9	6-15			
						* estimate limited data

The following information is based on specimens from the University of California, Davis, Herbarium. Robbins Hall. This information will provide geographic locations for the species as well as a Historical background of the species. This data is not presented as being all inclusive, but as being representative of the species.

Agrostis exarata

Alpine County

1. Ditch along the road at the base of a moist slope. Covered with sage and pines. North edge of Markleeville. Elevation 5500 feet. August 1957.
2. Sandy & rocky flood bed of Sliver Creek. Two tenths miles E of Sliver Mountain City site; 7.6 miles E of Ebbetts Pass Summit, along Highway 4. Elevation 6800 feet. August 1957.

El Dorado County

1. Decomposed granite roadbed, Chaparral covered foothills. One half mile S. of the new Salmon Fall Bridge. May 1958.
2. Ravine, ponderosa-digger pine assoc. One and a one half miles S of Garden Valley. July 1954.
3. South Lake Tahoe, Truckee Marsh, edge of water. August 1974.

Humboldt County

1. Sea Cliff near Trinidad. July 1928.

Lake County

1. In basalt rubble, margin of show's Lake. Three and one half miles E of Seiger Springs (by road). Elevation 2150 feet. June 1956.

Marin County

1. Ditch along the road, sandy clay soil, gentle slope above the sea. Three and eight tenths miles NW of Bolinas. June 1957.
2. Sandy clay loam soil. Banks above Bolinas Lagoon 0.75 miles N of Bolinas. August 1958.

Mendocino County

1. Sandy and gravelly soil of flats along the mouth of Ten Mile River at Highway 1. Eight miles N of Fort Bragg. July 1955.
2. Boggy area and forested area with understory of *Ericaceae* shrubs. extension of Oak Street, 1 mile E of Fort Bragg (Central). July 1955.
3. Moist edges of Hog Lake, Chaparral area. June 1954.
4. Hog Lake, James Pasture. Open wet ground adjacent to vernal pools. Elevation 2500 feet. June 1953.

Modoc County

1. Meadow, edge of shields Creek, Forested area. Warner Mountains, 20 miles E of Alturas. July 1954.
2. Peat meadow, Jess Valley, Warner Mountains. Fifteen miles E of Likely. July 1954.

Agrostis exarata continued

Nevada County

1. Donner Pass Summit. Interstate Highway 80. Meadow, lodgepole pine forest. Elevation 7239 feet. September 1965.

Orange County

1. Eight miles E of Santa Ana. April 1942.

Placer County

1. Roadside ditch, yellow pine and madrone forest. Six miles W of Forest Hill. June 1955.
2. Cisco Grove area. July 1963.

Sacramento County

1. Loamy sand flat along the Sacramento River, Elkhorn Ferry Road. Four miles NW of Sacramento. October 1953.
2. Five and one half miles W NW of Galt, Twin Cities road, Cosumnes River Sandy wash. August 1968.
3. Fair Oaks, Banks of American River. Sandy pocket. July 1955.

San Luis Obispo

1. In wet soil of a summer dry stream bed in Perfume Canyon near San Luis Obispo. July 1971.

Santa Cruz County

1. Sandy-rocky banks along the San Loran River. Sycamore Grove Campground, 1 mile N of Santa Cruz. June 1957.

Sierra County

1. Peat meadow, Gordon Van Vleck Ranch, Sierra Valley. Four miles NE of Sattley. July 1957.

Sonoma County

1. Sandy-clay soil, bog-like. Supporting a Bishop pine forest with an understore of *Ericaceae* shrubs. Highway 1, 8.7 miles S of Stewarts Point. July 1957.

Tulare County

1. South Fork of Kern River at lower end of Kennedy Meadows. Occasional in damp possibly subalkaline sand along a small stream in a broad long sagebrush valley in pinon-Jeffery pine woodland. Elevation 6200 feet August 1964.

Yolo County

1. Along Putah Creek, 6 miles W of Winters. Moist sandy flood plain in shade of *Populus*, and *Alnus*. June 1974.
2. Sandy flat along Putah Creek, Winters; Yolo-Solano Counties. June 1959.

SPECIES DESCRIPTION AND HABITAT	MLRA 4ETa	4ETa inch	PRECIP inches	ELEVATION (feet)	Frost FREE DAYS	Seed Data
<p><u><i>Bromus carinatus</i></u> California brome</p> <p>An erect annual, mostly short lived perennial grass 50 to 120 cm tall. Foliage variously hairy to glabrous; open panicles of 15-30 cm. Found in open ground, open pine and oak woods at low to middle altitudes. This species is extremely variable in size, in shape of panicle, and pubescence. Intergrades freely. Found below 11500 feet. Young foliage is relished by all classes of livestock. Mature foliage is harsh and less palatable. Could have extensive use for revegetation when seed is available. This highly variable grass invades open waste areas and cropland. In the vegetative stage it is difficult to distinguish from several other weedy bromes. Seed germination usually occurs in the fall; young plants overwinter, grow rapidly in the spring and reach maturity by early spring. Plants are generally considered self pollinating, florets often cleistomamous. Many botanists consider it a polymorphous species that includes <i>Bromus marginatus</i>, <i>B. maritimus</i>, <i>B. polyanthus</i>. All forms are closely related, and separations among them is made only arbitrarily.</p> <p>Collect seed from March to June. May be later at higher elevations</p>	4b	18-21	36-80	< 2625	250 - 300	<p>103,683 seeds per pound</p> <p>1 lb/ac = 2.4 seeds per square foot</p>
	4c	15-18	23-80	mnt. 3937		
	5b	18-21	36-85	325-4600	60 - 250	
	5c	15-18	23-85	mnt. 8858		
	5d	12-15	12-68			
	14c	15-18	24-39	< 1975	210 - 300	
	14d	12-15	12-30			
	14e	9-12	9-30			
	15c	15-18	15-40	< 2625	120 - 270	
	15d	12-15	12-40	mnt. 5577		
	15e	9-12	9-40			
	16e	9-12	6-15	<sealevel	270	
	18d	12-15	12-35	650-1650	200 - 320	
	18e	9-12	9-35	mnt. 3937		
	18f	6-9	6-15			
	19d	12-15	12-25	< 1975	250 - 365	
	19e	9-12	9-25			
	20d	12-15	12-40	1975-7875	100 - 200	
	20e	9-12	9-40	mnt.12139	<250	
	20f	6-9	6-15			
	21e	9-12	9-20	2625-4600	70 - 140	
	21f	6-9	6-15	mnt. 5900		
	22c	15-18	40-60	1650-7875	30 - 180	
	22d	12-15	12-60	mnt.14100		
	22e	9-12	9-53			
	22f	6-9	6-15			
	23f	6-9	6-14	3950-6900	30 - 140	
	23g	3-6	3- 6			
	26f	6-9	6-15	3950-6575	60 - 130	
	29f	6-9	6-15	1975-5575 mnt. 7874	60 - 200	

The following information is based on specimens from the University of California, Davis, Herbarium. Robbins Hall. This information will provide geographic locations for the species as well as a Historical background of the species. This data is not presented as being all inclusive, but as being representative of the species.

Bromus carinatus

Alameda County

1. Common. Shale soil, *Baccharis* & *Rhus* assoc. Along Redwood Rd, San Leandro Hills, 4.9 miles N of Castro Valley Blvd. June 1958.
2. Bridge near Greek Theatre, Berkeley. March 1914.
3. Berkeley. April 1914.
4. Berkeley Hills. June 1925.

Amador County

1. Common in clearings and under conifers. Nine miles W of Lake Amador. Elevation 7500 feet. July 1953.

Calaveras County

1. Two and two tenths miles NW of Mountain Ranch. Yellow pine-manzanita assoc. June 1959.

Contra Costa County

1. Clay soil hills with some oaks and chaparral just E of old Nortonville, and 7 miles SW of Antioch. May 1956.

El Dorado County

1. Infrequent. Under yellow pine, N slope of Pine Hill. Elevation 1800 feet. June 1956.
2. Cut road bank, reddish soil with crumbly micaceous rock. Yellow pine-incense cedar, black oak assoc. Two miles W of Omo Ranch Post Office. Elevation 3000 feet. June 1956.

Humboldt County

1. Open places among oaks. Frequent. July 1936.

Kern County

1. Weldon Meadow, Piute Mountain. Uncommon in moist soil in a broad sunny meadow in a Jeffery pine forest. Elevation 6800 feet. June 1962.

Marin County

1. Infrequent. Edge of a depression along the road. Black Point. April 1954.

Mendocino County

1. Roadside, open field area. Southwest of Hopland Field Station entrance. May 1956.

Bromus carinatus continued

Modoc County

1. Pit River, Stone Coal Valley. July 1935.

Monterey County

1. Common. Sandy soil under pines, Pacific Grove. May 1954.
2. Occasional. Highway 1, 4.2 miles N of Big Creek. Rocky clay on steep slopes. elevation 200 feet. Coastal sage. April 1967.

Napa County

1. Five miles S of Monticello, foothills. Shade of blue oaks. May 1954.
2. Howell Mountains, above Wooden Valley. Shallow draw, recent chaparral burn. May 1956.
3. Southeast of Capell Valley. Shade of blue oak. May 1956.

Placer County

1. Nyack Lodge area, Interstate 80 east bound. July 1969.
2. Placer-Nevada County line, Kingvale. Interstate 80 west. Elevation 6400 feet. Red fir-lodgepole pine forest. July 1967.

Sacramento County

1. Junction of Colma and Citrus Road, 2 miles N of Rancho Cordova. Shade of blue oaks. April 1959.

San Diego County

1. Highway 78, between Escondido and Ramona. April 1949.

San Francisco County

1. San Francisco. March 1932.
2. Forest Hills. April 1914.

San Luis Obispo County

1. Route 101, roadside. Arroyo Grande. April 1942.
2. Near Cayucos, coastal hills in shrubbery. March 1945.

Santa Barbara County

1. Common. Near Guadalupe, sandy roadside. May 1945.

Santa Clara County

1. West of Los Gatos in the foothills. May 1904.
2. Stevens Creek. Elevation 700 feet. May 1907.

Santa Cruz County

1. One mile S of Aptos. Thickets on hillside. June 1942.
2. In redwoods 1.5 miles N of Felton. June 1944.

Bromus carinatus continued

Siskiyou County

1. Siskiyou-Trinity County line, Long Gulch Camp, Klamath Nat'l Forest. Open ground, rocky granite outcropping. Elevation 6200 feet. July 1953.

Solano County

1. Along railroad, Vandeu. April 1954.
2. Vandeu. May 1928.

Sonoma County

1. Sonoma-Napa County line, State Highway 128, 5 miles NW of Calistoga. Shade of Douglas fir. June 1955.
2. Del Mar Ranch. June 1915.
3. Highway 1, roadbank, 1.4 miles SE of Bodega Bay. July 1957.

Tehama County

1. Whiskey Saddle, Crane Mills Logging Road. Mendocino Nat'l Forest. Elevation 4720 feet. Shade of conifers. June 1954.

Yuba County

1. Roadbank opposite Oregon House Store. Foothill flat, assoc. with *Elymus glaucus*. June 1957.

SPECIES DESCRIPTION AND HABITAT	MLRA 4ETa	4ETa inch	PRECIP inches	ELEVATION (feet)	Frost FREE DAYS	Seed Data
<p><u><i>Deschampsia cespitosa</i></u> Tufted Hairgrass</p> <p>A densely tufted perennial grass, 60 to 120 cm tall. Panicles open to loosely contracted, nodding, 10 to 25 cm. Spikelets 4 to 5 mm, pale or purple tinged. This species is found in wet areas, meadows, stream banks, coastal marshes, forests and alpine below 12800 feet. This species is found in the higher mnts. of southern California, north in the Sierra Nevada and Cascades; Coast Range from Santa Barbara to Del Norte Counties. Tufted Hairgrass is a principle constituent of mountain meadows, but it also occurs at lower elevations. An important range species in the western United States. Recovers from grazing well. Care required in management. Valued in soil erosion control.</p> <p>Lawrence (Amer. J. Bot. 32:298-314. 1945) distinguished 5 climatic ecotypes.</p> <p>Subspecies intergrade</p> <p>Collect seed from July to September. May be earlier at lower elevations.</p>	4b	18-21	36-80	< 2625	250 - 300	<p><u>1,864,350*</u> seeds per pound</p> <p>1 lb/ac = <u>42.8</u> seeds per square foot</p>
	4c	15-18	36-80	mnt. 3937		
	5b	18-21	36-85	325-4600	60 - 250	
	5c	15-18	23-85	mnt. 8858		
	5d	12-15	12-68			
	14c	15-18	15-39	< 1975	210 - 300	
	14d	12-15	12-30			
	15c	15-18	15-40	< 2625	120 - 270	
	15d	12-15	12-40	mnt. 5577		
	18d	12-15	12-35	650-1650	200 - 320	
	18e	9-12	9-35	mnt. 3937		
	18f	6-9	6-15			
	19d	12-15	12-25	< 1975	250 - 365	
	20e	9-12	9-40	mnt. 12139	100 - 200	
	21e	9-12	9-20	2625-4600	70 - 140	
	21f	6-9	6-15	mnt. 5900		
	22c	15-18	40-60	1650-7875	30 - 180	
	22d	12-15	12-60	mnt 14100		
	22e	9-12	9-53			
	22f	6-9	6-15			
						* estimate limited data

The following information is based on specimens from the University of California, Davis, Herbarium. Robbins Hall. This information will provide geographic locations for the species as well as a Historical background of the species. This data is not presented as being all inclusive, but as being representative of the species.

Deschampsia cespitosa

Alpine County

1. Meadow with *Veratrum*, over a low ridge N of State Highway 4 at Ebbetts Pass Summit. Elevation 8730 feet. August 1957.
2. Aspen grove along State Highway 88-89. West Carson River Basin, 0.2 miles W Of Sorenson's. Elevation 7200 feet. August 1957.
3. Hope Valley, State Highway 88. Bridge across West Fork of Carson River. Elevation 7100 feet. Stony riverbed. August 1962.
4. Below seepage area from snowbank on saddle above Fourth of July Lake. Carson Pass. Elevation 9210 feet. August 1974.

Butte County

1. Two and one half miles S SE of Butte Meadows. Sec. 4 Township 25N Range 4E. Elevation 4900 Feet. August 1936.

Colusa County

1. Bogg/stream between Indian and Bear Valleys. July 1944.

El Dorado County

1. South side of Echo Lake. North slope of Ralston Mountain. Elevation 7500 feet. Open meadows. July 1945.
2. El Dorado Nat'l Forest. Upper Range Camp 1. Elevation 7200 feet. September 1920.
3. Six miles S of Tavern, W side of Lake Tahoe. July 1932.
4. Upper Truckee River N of small bridge, South Shore, Lake Tahoe. July 1932.

Fresno County

1. Upper French Canyon Basin (Trib. Piute Creek and South San Joaquin River). West over Sierra Crest from Bishop, Inyo County. Royce and Merriam Peaks. Elevation 12500 feet. August 1955.

Kern County

1. Cienega at the head of Bitter Creek. Elevation 8500 feet. Jeffery pine forest. July 1966.

Lake County

1. Lake County. June 1941.

Lassen County

1. Lassen Nat'l Forest, meadow, Burgess Springs. Section 25 Township 33N Range 8E. Elevation 5500 feet. June 1941.
2. Common. Slate Creek, moist meadows. Elevation 6300 feet. August 1933.

Madera County

1. Manners trail, E branch of the North Fork of San Joaquin River, Sierra Nat'l Forest. Elevation 1000 feet. August 1919.
2. Soda Springs, San Joaquin River, Sierra Nat'l Forest. Elevation 9000 feet. August 1919.

Mono County

1. Near Tioga Pass. Elevation 9800 feet. August 1936.
2. Wet places around Rock Creek. Elevation 8000 feet. August 1916.

Napa County

1. Wet serpentine soil. Chaparral and digger pine assoc. above Capell Creek, N end of Capell Valley, Hwy 128. May 1957.

Plumas County

1. Prattville. July 1907.
2. Moist meadow, 0.5 miles N of Quincy. July 1939.
3. Plumas Nat'l Forest, 9 miles NW of Portola. Near Freeman Creek, NW end of Big Grizzly Valley. Elevation 6000 feet. August 1934.
4. Vicinity of Quincy. June 1949.

Sierra County

1. Meadows, Salmon Lakes. July 1929.

Siskiyou County

1. Wet meadows, Little Elk Lake, Marble Mountains. October 1958.
2. Wet meadow, open ground, Round Meadow. Elevation 5500 feet. August 1958.
3. Wet Mucky soil of a meadow, S slope of Gumbook Lake, Head waters of the South Fork of the Sacramento River. Fifteen miles SW of Mt. Shasta City. Elevation 6300 feet. *Abies*, *Pinus albicaulis* forest surrounds. August 1956.

Sonoma County

1. Common. Damp soil, above spring area. Rhododendron thicket. Pitkin Marsh, NW of Sebastopol, 1 mile N of Souza Corners. June 1950.

Trinity County

1. Serpentine slope, SW of Peanut. Elevation 2500 feet. July 1955.

Tulare County

1. Hamilton Lake, Sequoia Nat'l Park. Elevation 8300 feet. July 1934.
2. Common in wet soils, Cannell Meadow. A long sunny meadow in a yellow pine forest. Elevation 7200 feet. August 1967.
3. Common. Little Troy Meadow. Dry loam in a sagebrush meadow in a yellow pine forest. Elevation 7700 feet.
4. Occasional in very wet areas and shallow water. South Fork of the Kern River at Ramshaw Meadow, in a foxtail forest. Elevation 8700 feet. July 1970.
5. Occasional in wet metamorphic gravel on a sunny seep in an open broad canyon bottom, in a red fir forest. Elevation 8700 feet. July 1968.

Tuolumne County

1. Yosemite Park. 1897.
2. Tuolumne Meadows. August 1944.

SPECIES DESCRIPTION AND HABITAT	MLRA 4ETa	4ETa inch	PRECIP inches	ELEVATION (feet)	Frost FREE DAYS	Seed Data
<p><u><i>Deschampsia elongata</i></u> Slender Hairgrass</p> <p>A densely tufted, slender, erect, Short-lived perennial, 30 to 80 cm tall. Found throughout California with the exception of the desert areas. Found on moist soils, meadows, lake shores, and shaded slopes from 325 to 10175 feet. Seldom found in a dense stands, poor competitor with other plants. A Fair to good forage species early, less desirable with maturity.</p> <p>Collect seed from June to September.</p>	4b	18-21	36-80	< 2625	250 - 300	<p><u>1,626,156*</u> seeds per pound</p> <p>1 lb/ac = <u>37.3</u> seeds per square foot</p>
	4c	15-18	23-80	mnt. 3937		
	5b	18-21	36-85	325-4600	60 - 250	
	5c	15-18	23-85	mnt. 8858		
	5d	12-15	12-68			
	14c	15-18	24-39	< 1975	210 - 300	
	14d	12-15	12-30			
	14e	9-12	9-30			
	15c	15-18	15-40	< 2625	120 - 270	
	15d	12-15	12-40	mnt. 5577		
	15e	9-12	9-40			
	15f	6-9	6-15			
	16e	9-12	6-12	<sealevel	270	
	17d	12-15	12-25	< 650	230 - 350	
	17e	9-12	9-25			
	17f	6-9	6-15			
	18d	12-15	12-35	650-1650	200 - 320	
	18e	9-12	9-35	mnt. 3937		
	18f	6-9	6-15			
	19d	12-15	12-25	< 1975	250 - 365	
	19e	9-12	9-25			
	20d	12-15	12-40	1975-7875	100 - 200	
	20e	9-12	9-40	mnt.12139	<250	
	20f	6-9	6-15			
	21e	9-12	9-20	2625-4600	70 - 140	
	21f	6-9	6-15	mnt. 5900		
	22c	15-18	40-60	1650-7875	30 - 180	
	22d	12-15	12-60	mnt.14100		
	22e	9-12	9-53			
	22f	6-9	6-15			
	23f	6-9	6-14	3950-6900	30 - 140	
	26f	6-9	6-15	3950-6575	60 - 130	
	29f	6-9	6-15	1975-5575	60 - 200	
						*estimate limited data

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Deschampsia elongata

Alameda County

1. West shore of Lake Temescal, Oakland. Partially shaded slopes. Elevation 450 feet. May 1959.
2. Berkeley hills. 1914.

Fresno County

1. Creek 1.4 miles below Horse Corral Meadow, Southern Fresno County. Common in moist soil along small creek. Elevation 7250 feet. August 1962.

Glenn County

1. West of Plaskett Ranger Station on Old Road CA, 0.5 miles. Found in a moist open area. July 1942.
2. Plaskett Meadows. Elevation 6200 Feet. August 1943.

Humboldt County

1. Four miles N of Bridgeville. Sandy soil roadside and thickets. June 1942.
2. Hoopa Indian Reservation. Elevation 1000 feet. June 1901.
3. Large extensive stand from Garberville into Holbrook Grove. June 1936.
4. Bridgeville. July 1923.

Kern County

1. Mill Creek at Breckenridge Mountain Road. Common in wet sand along a stream in a broad sunny open yellow pine forest. July 1965.
2. West slope of Basket Peak. Common in wet soil in shaded seep in yellow pine forest. Elevation 5500 feet. August 1962.

Lake County

1. West of Lakeport 6.5 miles. June 1943.
2. West of Middletown 1 mile. June 1932.
3. Moist ravine N of Elk Mountain Summit. June 1941.
4. Oak belt between Allen Springs and Bartlett Springs in moist gravel near tributary of Cache Creek. June 1916.
5. Cobb Mountain. June 1941.

Marin County

1. Big Carson. 1916.

Mendocino County

1. Pine barrens 5 miles W of Fort Bragg. Sandy Soil surrounding sphagnum bog. July 1941.
2. North of Piercy 1.5 miles in redwood grove. June 1942.
3. South of Willits 5 miles on Route 101, shade of oaks. June 1942.

Napa County

1. South of Napa-Lake County line 1 mile on Route 29. North slope of Mount St Helena, ponderosa pine grove. June 1942.

Sonoma County

1. In woods at Del Mar Ranch. July 1916.
2. Northeast of Santa Rosa 10 miles on road to Calistoga. Open Woods. June 1942.
3. Spring Mountain Road. June 1941.

Tulare County

1. Jackass Creek just above Fish Creek. Common in sunny wet soil along creeks. Elevation 7400 feet. Jeffery pine forest. August 1969.
2. Little Cannell Meadow, Kern-Tulare Counties. Common in small narrow meadow on an open Jeffery pine forest. Elevation 7150 feet. July 1968.

Tuolumne County

1. South of Long Barn Corrals 1.5 miles. Creek bed, coniferous forest, old burn areas. Elevation 4600 feet. November 1965.

Yuba County

1. East of Brownsville 1 mile. Stony creek bed. Elevation 2400 feet.

SPECIES DESCRIPTION AND HABITAT	MLRA 4ETa	4ETa inch	PRECIP inches	ELEVATION (feet)	Frost FREE DAYS	SEED Data
<p><i>Elymus glaucus</i> Blue Wildrye</p> <p>Loose to densely tufted perennial grass, often bent at base, erect, 60 to 120 cm tall. Foliage green to glaucous. The spike is 5 to 20 cm long. Found through much of California below 8200 feet. Common in the foothills and lower mnt. slopes, usually in association with open stands of oaks and conifers. In open areas blue wildrye seldom occurs in any kind of a stand. As a forage grass, the species is useful early in the season but becomes too "stemmy" later on. There is a bewildering array of variation in this species. It seems possible that plants referred to as <i>Elymus glaucus</i> have had different origins and that we are here dealing with plants of a polyphyletic origin. Hybridizes freely with: <i>E. elymoides</i> <i>E. stebbinsii</i> <i>E. trachycaulus</i> <i>E. multisetus</i> <i>Hordeum brachyantherum</i></p> <p>There are three recognized subspecies.</p> <p>At least 4 species of <i>Elymus</i> are considered weedy species in the Western United States.</p> <p>Collect seed from June to August.</p>	4b 4c	18-21 15-18	36-80 23-80	< 2625 mnt. 3937	250 - 300	<p><u>134,900</u> seeds per pound</p> <p>1 lb/ac = <u>3.1</u> seeds per square foot</p>
	5b 5c 5d	18-21 15-18 12-15	36-85 23-85 12-68	325-4600 mnt. 8858	60 - 250	
	14d 14e	12-15 9-12	12-30 9-30	< 1975	210 - 300	
	15c 15d 15e 15f	15-18 12-15 9-12 6-9	15-40 12-40 9-40 6-15	< 2625 mnt. 5577	120 - 270	
	16e	9-12	6-15	<sealevel	270	
	17d 17e 17f	12-15 9-12 6-9	12-25 9-25 6-15	< 650	230 - 350	
	18d 18e 18f	12-15 9-12 6-9	12-35 9-35 6-15	650-1650 mnt. 3937	200 - 320	
	19d 19e	12-15 9-12	12-25 9-25	< 1975	250 - 365	
	20d 20e 20f	12-15 9-12 6-9	12-40 9-40 6-15	1975-7875 mnt.12139	100 - 200 <250	
	21e 21f	9-12 6-9	9-20 6-15	2625-4600 mnt. 5900	70 - 140	
	22c 22d 22e 22f	15-18 12-15 9-12 6-9	40-60 12-60 9-53 6-15	1650-7875 mnt.14100	30 - 180	
	23f	6-9	6-14	3950-6900	30 - 140	
	26f	6-9	6-15	3950-6575	60 - 130	
	29f	6-9	6-15	1975-5575 mnt. 7874	60 - 200	
	30g	3-6	2-6	175-650	280 - 350	

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Elymus glaucus

Butte County

1. Chico Meadow. Occasional in open places in yellow pine forest, but incense cedar, Douglas fir, and white fir are plentiful.

Calaveras County

1. West of Camanche 1 mile. In live oak and buckeye shade, foothill slope, clay slope. June 1959.

Contra Costa County

1. Markley Canyon, on Somersville Road, 4.4 miles SW of Antioch. Steep slope, sandstone formation. May 1956.

Glenn County

1. Old saw mill site, W of Bennet Spring on Newville Covelo Rd. Douglas fir and ponderosa pine assoc. June 1915.

Humboldt County

1. Alton. 1899.
2. North of Orleans 2 miles. Wooded bank of Klamath River. June 1942.
3. Bull Creek, near bridge. May 1932
4. North end of Luke Prairie. Section 20 Township 1S Range 2E. Elevation 1130 feet. June 1955.
5. Trinity county line near Cold Springs Lookout, South Fork Mountain. Fifteen miles NE of Bridgeville. Elevation 4000 feet. August 1951.

Kern County

1. Wofford Rd, 2 miles E of Greenhorn Pass. Small colony in white clay on sunny bank in a yellow pine forest. Elevation 5450 feet. September 1962.

Lake County

1. Northwest of Lakeport 7.5 miles on Scotts Valley Road to Blue Lake. June 1942.

Los Angeles County

1. San Gabriel Mountains, Los Angeles Nat'l Forest. Above Crystal Lake Recreation Area, Between Deer Flat Campground and Big Cienega Springs. Yellow pine forest. Elevation 6400 feet. July 1967.

Marin County

1. Woodside. June 1947.

Mariposa County

1. Northeast of Bootjack 3.7 miles. Found under yellow pine with oak and chaparral. Elevation 3000 feet. June 1956.

Mendocino County

1. Ukiah. May 1924.
2. North of Albion 0.5 miles on Hwy 1. Boggy soil, open area of a coastal mesa below the forested slopes. With *Calamagrostis* July 1955.

Modoc County

1. Pit River, Stone Coal Valley. July 1935.

Monterey County

1. Woods. Pacific Grove. July 1914.
2. Sun or shade dry granite slope. Assoc. *Rhus*, *Baccharis*, *Diplacus Eriogonum*. Closed pine forest and coastal scrub. May 1963.

Napa County

1. Above Capell Creek, N end of Capell Valley. Serpentine slopes, covered in chaparral and some digger pine. June 1957.
2. Conn Reservoir, south slopes. Five miles E of Rutherford. Serpentine soil. May 1960.

Placer County

1. Railroad embankment, Blue Canyon. Elevation 4700 feet. July 1956.
2. Shirttail Canyon, 6.5 miles W of Iowa Hill. Forested Slope. June 1955.
3. One mile W of Cisco Grove. Open coniferous forest, along stream, now dry. Elevation 5600 feet.

Riverside County

1. Hall Canyon, San Jacinto Mountains. Yellow pine forest. Elevation 5400 feet. July 1948.

San Luis Obispo County

1. Northwest of New District School 1.5 miles. Section 11, Township 30S, Range 14E. Elevation 1350 feet. June 1937.
2. Willow Valley Road, 8.5 miles NW of Templeton. Live oak woodland. May 1964.

San Mateo County

1. North city limits of Pacifica, along Highway 1, SW of its junction with Skyline Blvd. Coastal grassland, non-wooded hills above sea. June 1962.

Santa Barbara County

1. Bottom of Santa Barbara Canyon, near botanic garden. April 1944.

Santa Cruz County

1. Scotts Valley Roadside. Elevation 500-800 feet. June 1916.

Shasta County

1. Castle Crag. Dry soil along railroad banks, conifer-oak-maple forest. August 1956.
2. Cemetery on Route 299. Scattered clumps under oaks. May 1945.
3. Northeast corner of county, 2 miles W of Hat Creek. Open oak woods. May 1945.

Solano County

1. Ridge N of Vaca Mountain, roadside, chaparral. Elevation 2500 feet. June 1965.
2. Northwest of Rockville 2 miles. White clay soil, creek overflow. Assoc. *Sitanion jubatum* and *Sitanion hansenii*. May 1955.

Sonoma County

1. Mount St Helena. June 1932.
2. Del Mar Ranch. 1915.
3. One mile E of Occidental. Open serpentine slope, redwood forest. June 1959.

Yuba County

1. Roadbank opposite Oregon House Store. Foothill flat, assoc. with *Bromus carinatus*. June 1957.

SPECIES DESCRIPTION AND HABITAT	MLRA 4ETA	4ETA inch	PRECIP inches	ELEVATION (feet)	Frost FREE DAYS	Seed Data
<p><u><i>Elymus triticoides</i></u> Creeping Wildrye</p> <p>This is a rhizomatous perennial grass, 60 to 120 cm tall. Stems usually glaucous, rarely pubescent. Foliage is green or glaucous. The spike is 12 to 20 cm long. Found throughout California except in the desert areas. Found on heavy soils with adequate moisture during the growing season. Often found in saline meadows. Creeping wildrye often forms dense stands. In the sagebrush plant association east of the Sierra Nevada crest the grass is frequently valuable as forage. The grass resists trampling and recovers well following grazing. At low elevations it is much coarser than the succulent and tender annuals and is hence seldom utilized by grazing animals. It is a good soil binder. Found below 7550 feet. This species hybridizes with: <i>Leymus condensatus</i> <i>L. mollis</i> <i>L. cinereus</i></p> <p>At least 4 species of <i>Elymus</i> are considered weedy species in the Western United States.</p> <p>Collect seed from June to September. May be earlier.</p>	4b	18-21	36-80	< 2625	250 - 300	<p><u>114,000*</u> seeds per pound</p> <p>1 lb/ac = <u>2.6</u> seeds per square foot</p>
	4c	15-18	23-80	mnt. 3937		
	5b	18-21	36-85	325-4600	60 - 250	
	5c	15-18	23-85	mnt. 8858		
	5d	12-15	12-68			
	14c	15-18	24-40	< 1975	210 - 300	
	14d	12-15	12-30			
	14e	9-12	9-30			
	15c	15-18	15-40	< 2625	120 - 270	
	15d	12-15	12-40	mnt. 5577		
	15e	9-12	9-40			
	15f	6-9	6-15			
	16e	9-12	6-15	< sealevel	270	
	17d	12-15	12-25	< 650	230 - 350	
	17e	9-12	9-25			
	17f	6-9	6-15			
	18d	12-15	12-35	650-1650	200 - 320	
	18e	9-12	9-35	mnt. 3937		
	18f	6-9	6-15			
	19d	12-15	12-25	< 1975	250 - 365	
	19e	9-12	9-25			
	20d	12-15	12-40	1975-7875	100 - 200	
	20e	9-12	9-40	mnt. 12139	< 250	
	20f	6-9	6-15			
	21e	9-12	9-20	2625-4600	70 - 140	
	21f	6-9	6-15	mnt. 5900		
	22c	15-18	40-60	1650-7875	30 - 180	
	22d	12-15	12-60	mnt. 14100		
	22e	9-12	9-53			
	22f	6-9	6-15			
	23f	6-9	6-14	3950-6900	30 - 140	
	23g	3-6	3- 6			
	26f	6-9	6-15	3950-6575	60 - 130	
	29f	6-9	6-15	1975-5575	60 - 200	
						*estimate limited data

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Elymus Triticoides

Alameda County

1. Near end of Willow Road, SW of Newark. Alkaline flat. Elevation 10 feet. June 1958.
2. Corral Hallow. Dry flat along Arroyo. May 1939.
3. Coast Region. August 1915.

Contra Costa County

1. Above Suisun Bay. Clay soil, forested by oak. West of Martinez 3.2 miles on Crockett Road. May 1956.
2. Point Richmond on San Francisco Bay. June 1941.

Fresno County

1. Fresno County. May 1973.
2. Kings River bottom. East of Sanger, Annadale Ave. and Riverbend Road. May 1953.

Kern County

1. West of Fort Tejon 2.3 miles. Meadow below lake at Lebec. June 1946.

Lassen County

1. Near Thermos. July 1947.
2. Near Red Rock. Township 24N Range 17E. Elevation 4400 feet. August 1936.

Marin County

1. Near Ignacio. June 1933.

Mendocino County

1. At Albion, near Noyo. Mouth of Noyo River. August 1945.

Modoc County

1. Buck Creek, N Warner Mountains. August 1935.

Mono County

1. South of Coleville 3 miles. Elevation 5500 feet. June 1951.
2. White Mountains, Research Station. Elevation 10000 feet. August 1951.

Monterey County

1. Pacific Grove, shore. July 1914.
2. West of Greenfield 20 miles. September 1949.

Riverside County

1. Riverside, Fairmont Park. Elevation 800 feet. May 1904.
2. Wineville. 1915.

San Joaquin County

1. Highway 12, 5 miles SW of Lodi. July 1956.

San Luis Obispo

1. Paso Robles. 1923.
2. East of San Nargarita 10 miles. Assoc. oak. June 1942.

San Mateo County

1. Near San Bruno. May 1932.

Siskiyou County

1. Weed Valley. July 1932.
2. North of Gazelle 6 miles. Section 3 Township 43N Range 6W. June 1936.

Solano County

1. Rio Vista. May 1932.
2. Carquinez Strait, W part of Benicia. June 1972.
3. Cordelia. Adobe soil along railroad. October 1971.

Tulare County

1. North of XYZ Creek at Rockhouse Basin. Elevation 5700 feet. Assoc. pinyon pine forest. October 1964.

Yolo County

1. Bryte. Heavy adobe soil, low area. May 1953.
2. Knights Landing. May 1957.

SPECIES DESCRIPTION AND HABITAT	MLRA 4ETa	4ETa inch	PRECIP inches	ELEVATION (feet)	Frost FREE DAYS	Seed Data
<u><i>Festuca californica</i></u> California fescue Robust perennial forming clumps, 60-140 cm tall. Foliage quite scabrous, pubescent about the throat, panicle open, 10 to 30 cm. Found on open dry ground and woodland and usually found on serpentine soils. For grazing, palatability is best early and declines with maturity. This grass is found along the north coast south to Santa Barbara County and occasionally in Sierra foothills. Found below 5900 feet. Collect seed from May to June	4b	18-21	36-80	< 2625	250 - 300	<u>200,000*</u> seeds per pound 1 lb/ac = <u>4.6</u> seeds per square foot *estimate limited data
	4c	15-18	23-80	mnt. 3937		
	5b	18-21	36-85	325-4600	60 - 250	
	5c	15-18	23-85	mnt. 8858		
	5d	12-15	12-68			
	14c	15-18	24-39	< 1975	210 - 300	
	14d	12-15	12-30			
	14e	9-12	9-30			
	15c	15-18	15-40	< 2625	120 - 270	
	15d	12-15	12-40	mnt. 5577		
<u><i>Festuca idahoensis</i></u> Idaho fescue A densely tufted perennial grass, usually glaucous, but some forms are green. Plant is 30 to 100 cm tall. This species is found in northern California, in the Coast Range from Del Norte to Santa Barbara Counties, and in the Sierra north to Siskiyou, Modoc, and Lassen counties. This Species is found in open woods and rocky slopes below 5900 feet. Idaho Fescue grows best in the mnts., where it is important as a range grass because of its abundance and utilization. This species is very closely related to <i>Festuca ovina</i> . Collect seed from June to August.	15e	9-12	9-40			
	15f	6-9	6-15			
	18d	12-15	12-35	650-1650	200 - 320	
	22d	12-15	12-60	1650-7875 mnt.14100	30 - 180	
	29f	6-9	6-15	1975-5575 mnt. 7874	60 - 200	
	4b	18-21	36-80	< 2625	250 - 300	<u>450,000</u> seeds per pound 1 lb/ac = <u>10.3</u> seeds per square foot
	4c	15-18	23-80	mnt. 3937		
	5b	18-21	36-85	325-4600	60 - 250	
	5c	15-18	23-85	mnt. 8858		
	5d	12-15	12-68			
	14c	15-18	24-39	< 1975	210 - 300	
	14d	12-15	12-30			
	14e	9-12	9-30			
	15c	15-18	15-40	< 2625	120 - 270	
	15d	12-15	12-40	mnt. 5577		
	15e	9-12	9-40			
	18d	12-15	12-35	650-1650	200 - 320	
	21e	9-12	9-20	2625-4600	70 - 140	
	21f	6-9	6-15	mnt. 5900		
	22c	15-18	40-60	1650-7875	30 - 180	
	22d	12-15	12-60	mnt.14100		
	22e	9-12	9-53			
	23f	6-9	6-14	3950-6900	30 - 140	

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Festuca Californica

Alameda County

1. Niles Canyon, Sunol. June 1958.

Glenn County

1. Alder Springs Ranger Station. June 1963.

Humboldt County

1. Horse Mountain. June 1938.
2. Alder Point and Zenia. July 1947.

Lake County

1. Clear Lake (Western Shore). April 1941.

Marin County

1. Boot Jack Camp, Mount Tamalpais. April 1941.
2. Point Reyes. June 1945.
3. Whites Hill, San Rafael. May 1923.
4. Lagunitas. May 1916.
5. West-Point-Inn to Bolinas trail. May 1922.
6. Wood Acre.

Napa County

1. Conn Reservoir, 3.5 miles, Chiles Valley. May 1962.
2. East Rutherford. April 1950.
3. Near Pacific Union College, St Helena. April 1928.
4. North End Capell Valley (Highway 128). June 1964.
5. Mattley Canyon, Vaca Mountains. May 1956.

San Francisco County

1. San Francisco Mountains. November 1928.

San Luis Obispo County

1. Cypress Mountains. May 1958.

San Mateo County

1. San Bruno Mountains. April 1961.

Santa Cruz County

1. Mouth of Liddell Creek. May 1950.

Festuca Californica continued

Solano County

1. Gates Canyon, Vaca Mountains. May 1958.

Sonoma County

1. Near Santa Rosa. March 1941.

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Festuca idahoensis

Alameda County

1. Road to Livermore, W of Corral Hollow. North Facing slope. May 1939.

Del Norte County

1. One mile SW of Patrick Creek. Elevation 1000 feet. June 1936.

El Dorado County

1. Camp Sacramento area. Decomposed granite slopes above Hwy 50. Seeded. July 1978.

Humboldt County

1. Bald Mountain, grown at Hydesville. June 1951.

Lake County

1. Rocky volcanic slope above the W edge of Bogg Lake, NW of Mount Hannah. June 1953.

Lassen County

1. Fruit Growers Supply Company, Camp #10. June 1935.

Marin County

1. Lagunitas. Dry open slope in *Tsuga* forest. June 1945.

Mendocino County

1. Mendocino, Grindle Park. Partial shade of Douglas fir and spruce. May 1929.
2. Rattlesnake Mountain. June 1899.

Festuca idahoensis continued

Modoc County

1. Near Indian Springs, 7.3 miles E of Adin. On Rocky slope. May 1942.
2. Bear Mountain Ridge. August 1918.
3. Alturas. June 1935.

Napa County

1. Five miles S of Monticello. Foothills, shaded by blue oak. May 1954.
2. Five mile E of Rutherford. South slope, Conn Reservoir. Serpentine soil. Assoc. Chaparral. May 1960.

Plumas County

1. North of Sattley 5.75 miles. Section 4 Township 21N Range 14E. June 1936.

San Francisco County

1. Southeast of Twin Peaks. April 1929.

Siskiyou County

1. Soap Creek Ridge, between Yreka and Fort Jones. August 1949.
2. Highway 97, 2 miles S of Doris. Sagebrush flats. May 1942.
3. East of Hamburg 13 miles. Bank of Klamath River. Assoc. oak-pine. May 1942.

Sonoma County

1. Northwest of Santa Rosa 9.1 miles. Open roadside, N facing slope. June 1942.
2. Northwest of Graton 3 miles. Elevation 200 feet. May 1937.
3. Del Mar Ranch. May 1915.

Tehama County

1. Crane Mills Logging Road, 1 mile NW of Whiskey Saddle, Mendocino Nat'l Forest. Elevation 4850 feet. June 1954.

Trinity County

1. Indian Valley near Hayfork. Elevation 4000 feet.

SPECIES DESCRIPTION AND HABITAT	MLRA 4ETa	4ETa inch	PRECIP inches	ELEVATION (feet)	Frost FREE DAYS	Seed Data
<p><u><i>Festuca rubra</i></u> Red fescue</p> <p>Usually loosely tufted perennial grass. Bent or decumbent at the red or purplish base, erect or ascending, 40 to 100 cm. tall. Found in bogs, meadows and marshes in the cooler parts of the northern hemisphere extending south in the Coast Range to Monterey County, in the Sierra Nevada to the San Bernardino mnts. Livestock readily graze it though it seldom occurs in dense stands. There are distinct forms along the north coast on sand dunes, ocean bluffs and salt marshes. This species is found below 8200 feet.</p> <p>Collect seed from July to August. May be as early as June.</p>	4b	18-21	36-80	< 2625	250 - 300	<p><u>365,120</u> seeds per pound</p> <p>1 lb/ac = <u>8.4</u> seeds per square foot</p>
	4c	15-18	23-80	mnt. 3937		
	5b	18-21	36-85	325-4600	60 - 250	
	5c	15-18	23-85	mnt. 8858		
	5d	12-15	12-68			
	14c	15-18	24-39	< 1975	210 - 300	
	14d	12-15	12-30			
	14e	9-12	9-30			
	15c	15-18	15-40	< 2625	120 - 270	
	15d	12-15	12-40	mnt. 5577		
	15e	9-12	9-40			
	18d	12-15	12-35	650-1650	200 - 320	
	18e	9-12	9-35	mnt. 3937		
	20d	12-15	12-40	1975-7875	100 - 200	
	20e	9-12	9-40	mnt. 12139	<250	
	20f	6-9	6-15			
	22c	15-18	40-60	1650-7875	30 - 180	
	22d	12-15	12-60	mnt. 14100		
	22e	9-12	9-53			

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Festuca rubra

Alpine County

1. Highway 88, 1.8 miles W of Sorenson's. 1957.
2. Ebbetts Pass Summit. 1957.

Butte County

1. Chico Meadow's. 1929.

El Dorado County

1. South Lake Tahoe, Truckee Marsh. 1974.

Humboldt County

1. One mile NE of Samoa. 1936.
2. Near summit of Horse Mountain. 1948.

Lake County

1. Cold Creek, Mount Hannah Resort. 1956.
2. Summit Lake, near summit of Mount Sanhedrin. 1902.

Lassen County

1. Slate Creek, moist areas (not common). 1933.

Marin County

1. Paper Mill Creek, Lagunitas. 1945.
2. Whites Hill, near San Rafael. 1936.
3. A steep ravine beach, 5.6 miles N of Muir Beach, Highway 1. 1957.

Mendocino County

1. Four miles S of Fort Bragg. 1955.
2. Ten Mile Creek, 8 miles N of Fort Bragg on Highway 1. 1955.
3. Fifteen miles S of Fort Bragg. 1947.

Modoc County

1. Howard Gulch, 4 miles NW of Canby. 1935.
2. Jess Valley, Warner Mountains, 15 miles E of Likely.

Mono County

1. Rock Creek. 1916.

Festuca rubra continued

San Bernardino County

1. San Gabriel Mountains, San Antonio Canyon. 1967.
2. Bear Lake. 1942.

Siskiyou County

1. Antelope Creek, near Tennant. 1934.
2. Wagon Creek, Mount Eddy, elevation 7500 feet. 1921.

Sonoma County

1. Bodega Bay. 1944.
2. Eight miles from Santa Rosa, Calistoga on Petrified Forest Rd. 1918.
3. Del Mar Ranch. 1915.

SPECIES DESCRIPTION AND HABITAT	MLRA 4ETa	4ETa inch	PRECIP inches	ELEVATION (feet)	Frost FREE DAYS	Seed Data
<p><u><i>Hordeum brachyantherum</i></u> Meadow Barley</p> <p>A tufted perennial grass erect or ascending, 20 to 70 cm tall, sometimes 100 cm. Spike erect or slightly nodding, 8 to 10 cm. Found in meadows, bottom lands, salt marshes and grassy slopes below 11150 feet. Found throughout California, with the exception of the desert areas. As a forage plant, meadow barley is of some importance in the mnt. meadows where the early growth is well grazed by livestock, although its value is limited because it matures early in either high or low elevations. There are two accepted subspecies of <i>Hordeum brachyantherum</i>.</p> <p>"California Barley" is now a subspecies of <i>brachyantherum</i> i.e. <i>Hordeum brachyantherum californicum</i>.</p> <p>Hybridizes with: <i>Elymus trachycaulus</i> <i>Elymus glaucus</i></p> <p>Collect seed from April to July. May be later at higher elevations.</p>	4b 4c	18-21 15-18	36-80 23-80	< 2625 mnt. 3937	250 - 300	<p><u>100,798</u> seeds per pound</p> <p>1 lb/ac = <u>2.3</u> seeds per square foot</p>
	5b 5c 5d	18-21 15-18 12-15	36-85 23-85 12-68	325-4600 mnt. 8858	60 - 250	
	14c 14d 14e	15-18 12-15 9-12	24 39 12-30 9-30	< 1975	210 - 300	
	15c 15d 15e 15f	15-18 12-15 9-12 6-9	15-40 12-40 9-40 6-15	< 2625 mnt. 5577	120 - 270	
	16e	9-12	6-15	<sealevel	270	
	17d 17e 17f	12-15 9-12 6-9	12-25 9-25 6-15	< 650	230 - 350	
	18d 18e 18f	12-15 9-12 6-9	12-35 9-35 6-15	650-1650 mnt. 3937	200 - 320	
	19d 19e	12-15 9-12	12-25 9-25	< 1975	250 - 365	
	20d 20e 20f	12-15 9-12 6-9	12-40 9-40 6-15	1975-7875 mnt.12139	100 - 200 <250	
	21e 21f	9-12 6-9	9-20 6-15	2625-4600 mnt. 5900	70 - 140	
	22c 22d 22e 22f	15-18 12-15 9-12 6-9	40-60 12-60 9-53 6-15	1650-7875 mnt.14100	30 - 180	
	23f 23g	6-9 3-6	6-14 3- 6	3950-6900	30 - 140	
	26f	6-9	6-15	3950-6575	60 - 130	
	29f	6-9	6-15	1975-5575 mnt. 7874	60 - 200	

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Hordeum Brachyantherum

Alameda County

1. University of California, Berkeley Campus. 1915.
2. Occasional in vacant lots. Sandy loam. May 1941.
3. Berkeley Hills. May 1914.
4. Berkeley, Shasta Rd. Depressions on open hillside. June 1939.

Amador County

1. Spring drain off, Tragedy Springs. Elevation 8000 feet. July 1953.

Alpine County

2. South shore Red Lake. Elevation 8000 feet. July 1953.
3. Streambed 1 mile N of Wood Lake, 1 mile W of Carson Pass. Elevation 8500 feet. July 1953.

Contra Costa County

1. Meadow of Buchanan Field, 1 mile E of Pacheco. Heavy adobe soil. May 1948.

El Dorado County

1. One mile SW of Garden Valley. Meadow along creek between serpentine outcrops. July 1954.

Glenn County

1. Plaskett Meadows. August 1942.

Humboldt County

1. Eureka. July 1950.

Kern County

1. Common. West side of Lynns Valley. Moist heavy loam soil on a broad sunny marsh flat. Elevation 3200 feet. Assoc. white oak woodland. May 1964.
2. Not common. South of Weedpatch 4.5 miles. Alkaline adobe soil. Assoc. *Salicornia*, *Suaeda*, and *Distichlis*. April 1955.

Lake County

1. Clear Lake, SW side along road. April 1941.

Lassen County

1. Streambed near Fruit Growers Supply Company, Camp #10. March 1935.
2. Highway 36, 4.5 miles W of Susanville. Dry meadow in loose volcanic ash. Elevation 4700 feet. July 1954.

Marin County

1. Common. Coastal grassland above dunes, 2.5 miles NE of Point Reyes Lighthouse. July 1954.

Mendocino County

1. Mouth of Ten Mile River, Highway 1, 8 miles N of Fort Bragg. Sandy and gravelly flats. July 1953.

Modoc County

1. Alkaline meadow near radio station (KCNO), 2.5 miles E of Alturas. July 1954.
2. Patterson Mill, Silver Creek Road. Elevation 6000 feet. June 1946.

Mono County

1. Route 395, 8 miles S of junction with Route 120. Mountain meadow west side of Mono Lake. June 1942.

Monterey County

1. Pacific Grove. May 1903.

Nevada County

1. Lower end of Donner Lake. July 1903.
2. Meadow along Highway 40, 4 miles W of Soda Springs. Elevation 6200 feet. July 1953.

San Bernardino County

1. San Bernardino Mountains. Marsh at edge of Bear Lake. Assoc. with *Juncus*, *Mimulus*, and *Salix*. June 1939.

Santa Barbara County

1. West of Goleta, along railroad near Dos Pueblos Orchid Company. Sea Cliff. Elevation 100 feet. April 1963.

Solano County

1. By Dozer Station. April 1949.
2. Creek overflow near road from Green Valley to Rockville. May 1953.
3. Near Fairfield Air Base. May 1948.

Sonoma County

1. Slope of serpentine knob, along Highway 101, N of Healdsburg. April 1955.

Yolo County

1. Alkaline soil. Six miles SE of Woodland. April 1953.

SPECIES DESCRIPTION AND HABITAT	MLRA 4ETa	4ETa inch	PRECIP inches	ELEVATION (feet)	Frost FREE DAYS	Seed Data
<p><u><i>Melica californica</i></u> California Melic</p> <p>A densely or loosely tufted perennial grass, 60 to 120 cm tall. rhizomatous, short or missing. The base is usually decumbent and somewhat enlarged. This species is found on slopes and canyons of the foothills, oak woodland, occasionally in brushland and pine forests at lower elevations. Found in the Sierra Nevada and Coast Range below 6900 feet.</p> <p>Collect seed from April to July.</p>	4b	18-21	36-80	< 2625	250 - 300	<p><u>326,341*</u> Seeds per pound</p> <p>1 lb/ac = <u>7.5</u> seeds per square foot</p> <p>*estimate limited data</p>
	4c	15-18	23-80	mnt. 3937		
	5b	18-21	36-85	325-4600	60 - 250	
	5c	15-18	23-85	mnt. 8858		
	5d	12-15	12-68			
	14c	15-18	24-39	< 1975	210 - 300	
	14d	12-15	12-30			
	14e	9-12	9-30			
	15c	15-18	15-40	< 2625	120 - 270	
	15d	12-15	12-40	mnt. 5577		
<p><u><i>Melica imperfecta</i></u> Coastrange Melic</p> <p>Densely or sometimes loosely tufted perennial grass, 30 to 90 cm tall. Stems may be erect or ascending, base sometime decumbent. Found at low to medium elevations in the Coast Range from San Diego Co. north to Lake County and in the south and central Sierra Nevada and the western edge of the Mojave Desert. Associated with brushland, or rocky soil in oak woodland and lower elevation coniferous forests. It is a valuable forage grass for all classes of livestock. Found below 4920 feet.</p> <p>Collect seed from April to July.</p>	18e	9-12	9-35	650-1650	200 - 320	
	18f	6-9	6-15	mnt. 3937		
	20d	12-15	12-40	1975-7875	100 - 200	
	20e	9-12	9-40	mnt.12139	<250	
	14d	12-15	12-30			<p><u>492,076</u> seeds per pound</p> <p>1 lb/ac = <u>11.3</u> seeds per square foot</p>
	14e	9-12	9-30			
	15d	12-15	12-40	< 2625	120 - 270	
	15e	9-12	9-48	mnt. 5577		
	15f	6-9	6-15			
	18d	12-15	12-35	650-1650	200 - 320	
	18e	9-12	9-35	mnt. 3937		
	18f	6-9	6-15			
	19d	12-15	12-25	< 1975	250 - 365	
	19e	9-12	9-25			
	20d	12-15	12-40	1975-7875	100 - 200	
	20e	9-12	9-40	mnt.12139	<250	
	20f	6-9	6-15			
	29f	6-9	6-15	1975-5575	60 - 200	
				mnt. 7874		

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Melica californica

Butte County

1. Little Chico Creek. May 1896.
2. Seven miles below Centerville, Butte Creek. Elevation 250 feet. April 1915.

Calaveras County

1. West of San Andreas along road to Kentucky House. Assoc. live oak, scrub oak, digger pine, and *Rhamnus*. April 1968.

Contra Costa County

1. East of Old Nortonville, 7 mile SW of Antioch. Clay soil with some oak and chaparral. May 1956.
2. Near Richmond, coastal bluffs. Assoc. *Stipa cernua*. April 1941.

El Dorado County

1. North slope of Pine Hill. Shaded slope, assoc. open yellow pine, black oak, manzanita forest. Elevation 2000 feet. June 1956.
2. Pilot Peak Lookout. Elevation 1925 feet. June 1969.

Fresno County

1. Old Road, 2 miles beyond Trimmer and SE of mouth of Sycamore Creek. Foothill woodland. May 1953.

Kern County

1. North flank of Blue Mountain. Occasional about granite outcrops Assoc. Douglas pine-oak forest. Elevation 4200 feet. May 1964.
2. Greenhorn Mountain, over 4 miles SW of Eugene Grade. Soil granite-gravel, very dry. Elevation 4400 feet. May 1966.

Lake County

1. West of Leesville, N side of W slope. Assoc. Chaparral (*Ceanothus* and manzanita) oak. May 1919.

Madera County

1. Awahnee, between Mariposa and Bass Lake. May 1932.

Mariposa County

1. Triangle Road at Buckingham Mountain School, 12 miles E of Mariposa. Elevation 3175. Assoc. yellow pine, oak, chaparral area. June 1956.

Melica californica continued

Napa County

1. East of Chiles Valley School 0.5 miles along Highway 128. Assoc. bay tree, digger pine, chaparral. May 1962.
2. Between Wragg Canyon and SE of Cappell Valley. May 1956.

Placer County

1. Forest Hill Road, 2 miles S of Highway 40, Bunch Canyon. Shale outcropping. Assoc. chaparral. June 1955.

Sacramento County

1. American River, Fair Oaks. Shaded slopes along road. April 1959.
2. Haig place, just W of Folsom. June 1951.

Solano County

1. Vaden, along railroad. One mile W. April 1954.
2. Gates Canyon, Vaca Mountains, roadbank. May 1958.

Sutter County

1. Sutter Buttes. May 1914.

Tehama County

1. West of Red Bluff 10 miles. Oak covered flats. May 1942.

Tulare County

1. North of Visalia. Open oak forest. April 1942.
2. Fountain Springs, SE of Porterville. Elevation 79 feet. May 1932.

Yolo County

1. West of Caypay. Assoc. *Stipa pulchra*. April 1944.
2. West of Winters 2.5 miles. May 1950.
3. Northwest of Rumsey 2.4 miles on Highway 16 and above Cache Creek. Sandstone rubble at foot of bluff. April 1958.

Yuba County

1. Browns Valley, 5 miles E Sierra Field Station. Assoc. blue and live oak woodland.

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Melica imperfecta

Alameda County

1. Oakland Hills, above Mills College. April 30, 1944.

Fresno County

1. North Friant, Kerkoff Dam. March 24, 1932.
2. Squaw Valley. April 1921.
3. Diablo Range, 8 miles W of Coalinga, on Middle slopes of rocky hill.
Assoc. *Poa scabrella*. April 13, 1941.

Los Angeles County

1. Mouravia. June 1915.

Monterey County

1. Pacific Grove, dry woods. May 4, 1914.

Riverside County

1. Near Riverside. 1919.
2. Riverside and vicinity South Fork of Arroyo Terquisquit, opposite Ore Ranch. March 17, 1906.
3. Bedford Canyon, Cleveland National Forest. March 1934.
4. San Jacinto Mountains. Assoc. with *Poa secunda*. June 10, 1946.

San Francisco County

1. San Francisco. March 22, 1932.

Santa Barbara County

1. Five miles E of Santa Maria. May 3, 1944.
2. Los Pardes National Forest, N of San Maroos Pass. April 17, 1942.
3. State Park near Gaviota. April 24, 1942.

Santa Clara County

1. Stevens Creek. March 17, 1907.
2. West Los Gatos. April 23, 1904.

San Luis Obispo County.

1. San Luis Obispo Co. April 5, 1939.

Tulare County

1. California Hot Springs. Under dense cover. May 25, 1932.

SPECIES DESCRIPTION AND HABITAT	MLRA 4ETa	4ETa inch	PRECIP inches	ELEVATION (feet)	Frost FREE DAYS	Seed Data
<u><i>Oryzopsis hymenoides</i></u> Indian Ricegrass A densely tufted perennial grass, 30 to 90 cm tall. Found throughout the Mojave desert, Sierra Nevada, Cascades, and Great Basin below 11150 feet. Found in arid or semi-arid areas and may be abundant on sandy soils. It is a valuable forage grass in these areas. Will be damaged if overgrazed. It is known to hybridize with 11 species of <i>Stipa</i> , some forms of which are sterile. Collect seed from April to June.	18d	12-15	12-35	650-1650	200 - 320	<u>161,920</u> Seeds per pound 1 lb/ac = <u>3.7</u> Seed per square foot
	18e	9-12	9-35	mnt. 3937		
	18f	6-9	6-15			
	19d	12-15	12-25	< 1975	250 - 365	
	19e	9-12	9-25			
	20d	12-15	12-40	1975-7875	100 - 200	
	20e	9-12	9-40	mnt.12139	<250	
	20f	6-9	6-15			
	21e	9-12	9-20	2625-4600	70 - 140	
	21f	6-9	6-15	mnt. 5900		
	22c	15-18	40-60	1650-7875	30 - 180	
	22d	12-15	12-60	mnt.14100		
	22e	9-12	9-53			
	22f	6-9	6-15			
	23f	6-9	6-14	3950-6900	30 - 140	
	23g	3-6	3- 6			
	26f	6-9	6-15	3950-6575	60 - 130	
	29f	6-9	6-15	1975-5575 mnt. 7874	60 - 200	
	30g	3-6	2- 6	325-3950	<240-320	
	31g	3-6	2- 4	175-650	280 - 350	

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Oryzopsis hymenoides

Alpine County

1. Sandy and rocky basalt road cut, State Highway 4, above Silver Creek, 0.3 miles E of the site of the old town Silver Mountain, 7.7 miles E of Ebbetts Pass. August 5, 1957.

Inyo County

1. Cerro Gordo Park, Inyo Mnts. Elevation. 8000 ft.
2. Olancho, Rt 395, road side. June 26, 1942.

Kern County

1. Sandy Granitic soil, 4 miles N Mojave. April 25, 1955.
2. Owens Peak. April 11, 1941.

Lassen County

1. Near Litchfield. June 28, 1941.

Los Angeles County

1. Antelope Valley. April 1933.
2. Lancaster Area. June 1902.
3. North east 0.5 miles from Pearblossom, Highway 138. May 7, 1963.
4. Six miles W of Liano. April 4, 1942.
5. Hwy 99, 5 miles S of Gorman. June 16, 1939.

Modoc County

1. Hackmore, open flat. July 1, 1935.
2. Cemetery, Alturas. July 21, 1935.

Mono County

1. Fifteen miles NW of Benton, Great Basin, allotment BLM. June 23, 1964.
2. Little Round Valley. July 2, 1952.

Riverside County

1. Morongo Pass, near White Water Station, Colorado Desert March 24, 1928.
2. Palm Springs. April 1907.
3. Six miles SE Garnet Station, Colorado Desert. March 11, 1928.
4. Sat Creek Wash, Colorado Desert, E Mecca. March 19, 1921.
5. White Water, Colorado Desert. March 24, 1921.
6. Riverside Co., Near Whitewater, Coachella Valley. April 11, 1948.

San Bernardino County

1. Route 66, 12 miles W of Ludlow. Shrub covered desert, level stretch. April 23, 1942.
2. Kramer Hills, S Kramer junction, Highway 395. April 13, 1938.
3. Mojave Desert, N of Victorville. May 27, 1927.
4. San Bernardino Mnt., Bear Valley. Elevation 6800 ft. June 24, 1937.
5. Mojave Desert, Mescal Range, just E of Mountain Pass Summit, Highway 466. March 23, 1967.
6. Fountain Canyon, Providence Mountains. May 17, 1937.
7. Sandy area 5 miles SE of Dale Dry Lake, between Sheep hole Mountain and Pinto Mountains, E of 29 Palms. April 15, 1958.
8. Loose soil, sandy wash, 6.5 miles S of Dagget. April 27, 1955.
9. Fifteen miles SW of Baker, Mojave Desert. February 9, 1947.
10. Randsburg Rd, N of Adelanto. April 15, 1937.

Tulare County

1. Mineral King, Crystal Creek, steep slope metamorphic gravel. Elevation 8500 ft. July 19, 1969.
2. Kennedy Meadows Forest Rd., 1.9 miles E of Tray Meadow, Kern Plateau. September 19, 1962.

Tuolumne County

1. Near summit of Eagle Peak. August 2, 1946.

SPECIES DESCRIPTION AND HABITAT	MLRA 4ETA	4ETA inch	PRECIP inches	ELEVATION (feet)	Frost FREE DAYS	SEED Data
<p><u>Poa Scabrella</u> Pine Bluegrass</p> <p>An erect perennial grass, 50 to 100 cm tall. Panicle narrow, usually contracted, 5 to 12 cm long. found throughout California from sea level to timberline and into the desert. At low elevations the grass becomes dormant with the onset of hot weather. In the mnts., it grows actively all summer. At higher elevations, it is good forage for livestock. At one time it was thought to have been abundant in the Central Valley along with <i>Stipa pulchra</i> and others. Found below 12470 feet.</p> <p>Currently there are two recognized subspecies; <i>ssp. juncifolia</i> and <i>spp. secunda</i>.</p> <p><i>ssp. secunda</i> has many ecological forms which have been named; all intergrade completely, probably do not warrant taxonomic recognition.</p> <p>Collect seed from May to August. May be later at higher elevations.</p>	4b 4c	18-21 15-18	36-80 23-80	< 2625 mnt. 3937	250 - 300	<p>1,046,960 Seeds per pound</p> <p>1 lb/ac = 24.0 seeds per square foot</p>
	5b 5c 5d	18-21 15-18 12-15	36-85 23-85 12-68	325-4600 mnt. 8858	60 - 250	
	14c 14d 14e	15-18 12-15 9-12	24-39 12-30 9-30	< 1975	210 - 300	
	15c 15d 15e 15f 15g	15-18 12-15 9-12 6-9 3-6	15-40 12-40 9-40 6-15 3- 6	< 2625 mnt. 5577	120 - 270	
	16e	9-12	6-15	<sealevel	270	
	17d 17e 17f 17g	12-15 9-12 6-9 3-6	12-25 9-25 6-15 3- 6	< 650	230 - 350	
	18d 18e 18f	12-15 9-12 6-9	12-35 9-35 6-15	650-1650 mnt. 3937	200 - 320	
	19d 19e	12-15 9-12	12-25 9-25	< 1975	250 - 365	
	20d 20e 20f	12-15 9-12 6-9	12-40 9-40 6-15	1975-7875 mnt.12139	100 - 200 <250	
	21e 21f	9-12 6-9	9-20 6-15	2625-4600 mnt. 5900	70 - 140	
	22c 22d 22e 22f	15-18 12-15 9-12 6-9	40-60 12-60 9-53 6-15	1650-7875 mnt.14100	30 - 180	
	23f 23g	6-9 3-6	6-14 3- 6	3950-6900	30 - 140	
	26f	6-9	6-15	3950-6575	60 - 130	
	29f	6-9	6-15	1975-5575 mnt. 7874	60 - 200	
	30g	3-6	2- 6	325-3950	<240-320	
	31g	3-6	2- 4	175-650	280 - 350	

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Poa scabrella

Amador County

1. Beside Highway 88, 5 miles below Cook's Station. Found in yellow pine forest. Elevation 4000 feet. June 1954.

Butte County

1. Steep serpentine slopes 0.25 miles E of Pulga. Township 23N Range 5E Section 32. Elevation 1600 feet. March 1982.

El Dorado County

1. Bass Lake, NE of Clarksville. Serpentine soils. May 1976.

Fresno County

1. Diablo Range, 8 miles W of Coalinga, on middle slope of rocky hill. Assoc. *Melica imperfecta*. April 1941.

Glenn County

1. Ridge W of sawmill near Bennet Springs on the Newville-Covell Road. Elevation 4000 feet. June 1915.

Kern County

1. Sandy-granitic soil, 4 miles N of Mojave. Assoc. *Larrea*. April 1955.

Lassen County

1. Mountain meadow 10 miles W of Chester. Elevation 5000 feet. June 1941.

Los Angeles County

1. Uncommon. Chatsworth Reservoir at W end of San Fernando Valley. Elevation 1200 Feet. March 1978.

Madera County

1. Open sandy field, 2 miles S of Chowchilla and 12 miles N of Fresno on Highway 99. April 1942.

Mendocino County

1. Dry open rocky places, S and W slopes. Summit of Bald Mountain. July 1967.

Monterey County

1. Uncommon. Found on sandstone outcrop, 0.5 miles W of Pine Flat Camp, Ventana Wilderness. May 1989.

Napa County

1. Between Wragg Canyon and SE Capell Valley. Assoc. Digger pine-oak woodland with some intermittent chaparral. May 1956.

Nevada County

1. Dry rocky soil, full sun, 2 miles W of Sagehen Creek Station, W of Highway 89. Assoc. *Wyethia*. Elevation 6400 feet. July 1964.
2. Highway 20, 5 miles E of Nevada City. Assoc. *Arctostaphylos* and *Quercus*. Elevation 4000 feet. May 1964.

Plumas County

1. French Creek. Township 24N Range 15E Section 28-29. July 1967.

Riverside County

1. San Jacinto Mountains. Assoc. *Melica imperfecta*. June 10, 1946.

Sacramento County

1. Roadside E of Sacramento. April 1947.

San Benito County

1. Between Pinnacles and Bitter Water. Very common along road. April 1950.

San Bernardino County

1. Rock Crevices of canyon walls and talus slopes, 9 miles S. of Dagget. April 1955.
2. North section of San Triniteo Canyon, S of Redlands. Elevation 1200 feet. April 1951.

San Diego County

1. Near Del Mar. April 1888.

Santa Barbara County

1. Hwy 166, Cuyama Canyon. April 1949.
2. Woodland at Tunnel Portal, Mission Canyon. Elevation 1300 feet. April 1944.

Poa scabrella continued

Santa Cruz County

1. Grahan Hill, near Felton. Elevation 450 feet. May 1942.

Sierra County

1. Shaded bank of a road cut, Highway 49. South slope of N side of Yuba River, 7 miles NE of Camptonville. May 1964.

Siskiyou County

1. Dry slopes above Gumboat Lake, the headwaters of the south fork of the Sacramento River. Elevation 6300 feet. August 1956.
2. Vernal ponds surrounded by fir and cedar, along Highway 97, SW of Hebron Summit. Elevation 5000 feet. May 1958.

Solano County

1. South of Highway 128, 0.5 miles on Pleasants Valley Rd. Assoc. annual lupine, clover, grass, oak, manzanita, and digger pine. March 1963.

Tehama County

1. West of Red Bluff 33 miles on Route 36. Found Among rocks in stream bed. Button Canyon Experimental Plot. May 1942.

Tuolumne County

1. Foothills. May 1950.

Yolo County

1. Winters area. Blue oak woodland.
2. Esparto area. April 1927.

Yuba County

1. Sierra Foothill Field Station. May 1974.

SPECIES DESCRIPTION AND HABITAT	MLRA 4ETa	4ETa inch	PRECIP inches	ELEVATION (feet)	Frost FREE DAYS	Seed Data
<p><u><i>Sitanion hystrix</i></u> Squirreltail</p> <p>An erect to spreading, rather stiff perennial grass, 10 to 50 cm tall. Grows best on dry slopes of the mountains, but occurs throughout Calif. from sea level to timberline. Although it may be abundant, it is a poor forage grass because of the long scabrous awns. It is abundant on rocky, sandy soils where other vegetation does poorly. Found below 13750 feet. Known to hybridize with: <i>Elymus glaucus</i> <i>E. trachycaulus</i> <i>E. saundersii</i> <i>Pseudoroegneria spicata</i></p> <p>At least 4 species of <i>Elymus</i> are considered weedy species in the Western United States. <i>S. hystrix</i> is considered one of the weedy species.</p> <p>Collect seed from April to August.</p>	5b	18-21	36-85	325-4600	60 - 250	<p><u>136,080</u> seeds per pound</p> <p>1 lb/ac = <u>3.1</u> seeds per square foot</p>
	5c	15-18	23-85	mnt. 8858		
	5d	12-15	12-68			
	15d	12-15	12-40	< 2625	120 - 270	
	15e	9-12	9-40	mnt. 5577		
	15f	6-9	6-15			
	15g	3-6	3- 6			
	18d	12-15	12-35	650-1650	200 - 320	
	18e	9-12	9-35	mnt. 3937		
	18f	6-9	6-15			
	19d	12-15	12-25	< 1975	250 - 365	
	19e	9-12	9-25			
	20d	12-15	12-40	1975-7875	100 - 200	
	20e	9-12	9-40	mnt.12139	<250	
	20f	6-9	6-15			
	21e	9-12	9-20	2625-4600	70 - 140	
	21f	6-9	6-15	mnt. 5900		
	22c	15-18	40-60	1650-7875	30 - 180	
	22d	12-15	12-60	mnt.14100		
	22e	9-12	9-53			
	22f	6-9	6-15			
	23f	6-9	6-14	3950-6900	30 - 140	
	23g	3-6	3- 6			
	26f	6-9	6-15	3950-6575	60 - 130	
	29f	6-9	6-15	1975-5575	60 - 200	
				mnt. 7874		
	30g	3-6	2- 6	325-3950	<240-320	
	31g	3-6	2- 4	175-650	280 - 350	

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Sitanion hystrix

Alpine County

1. Highway 4, 0.5 miles W of Ebbetts Pass Summit. Dry slopes of decomposed granite, with sparse conifer and sagebrush. August 1957.
2. Kit Carson Pass Summit, Highway 88. Sandy pockets among granite boulders. Elevation 8573 feet. August 1957.

Colusa County

1. Little Stony Creek Canyon, 4-8 miles W of Lodoga. Serpentine soil area, slopes covered with chaparral. May 1958.

Fresno County

1. North side of Kaiser Ridge on trail 0.5 miles NW of Potter Pass. North Facing limestone slope. Assoc. *Abies magnifica*, *Pinus monticola*, *P. murrayana*, *Tsuga*, *Linum lewisii*, *Cymopterus terebinthinus*, and *Crepis acuminata*. Elevation 8600 feet. August 1952.

Lassen County

1. South of Ravendale 15 miles along Highway 395. Assoc. juniper. Found among lava boulders, plateau. Elevation 5500 feet. July 1954.

Mono County

1. Found along the banks of Crowley Lake, open marshy ground. June 1942.

Riverside County

1. Found along the margins of warm sandy flats in assoc. with yellow pine. Elevation 5400 feet. July 1948.

San Bernardino County

1. New York Mountains, 5 miles S of Ivanpah. Elevation 4400 feet. May 1967.
2. Mount Ord, 2 miles W of Sweetwater Springs, 15 miles S of Daggett. Northwest facing slope, gravelly wash. Assoc. *Larrea* and *Thamnosma*. April 1957.

Sierra County

1. Five miles NE of Sierraville. Wet rocky slopes above North Fork of the Yuba River. August 1944.

Sitanion hystrix continued

Siskiyou County

1. Locally common. Trinity County line, N of campground, Scott Mountain divide, SE of Callahan. Dry, bare soil, open areas. July 1956.

Tehama County

1. Summit of S Yolla Bolly Mountain. Elevation 8090 feet. July 1959.

Tuolumne County

1. Gaylor Lakes, W of Tioga Pass, Yosemite Nat'l Park. July 1936.
2. Alpine slopes, Mount Conness, Yosemite Nat'l Park. July 1936.

SPECIES DESCRIPTION AND HABITAT	MLRA 4ETA	4ETA inch	PRECIP inches	ELEVATION (feet)	Frost FREE DAYS	Seed Data
<p><u>Sitanion jubatum</u> Big Squirreltail</p> <p>An erect to ascending perennial grass, 20 to 60 cm tall. Spike erect 3 to 10 cm long. Similar to <i>S. hystrix</i>, with the exception of a bushy spike. Found throughout California along rocky or brushy hill sides and open dry woods and plains. Grows best at lower elevations. Found below 10500 feet. Hybridizes with: <i>Elymus glaucus</i> <i>E. trachycaulus</i> <i>Pseudoroegneria spicata</i></p> <p>At least 4 species of <i>Elymus</i> are considered weedy species in the Western United States.</p> <p>Collect seed from May to July.</p>	5b	18-21	36-85	325-4600	60 - 250	<p><u>126,327</u> Seeds per pound</p> <p>1 lb/ac = <u>2.9</u> seeds per square foot</p>
	5c	15-18	23-85	mnt. 8858		
	5d	12-15	12-68			
	14c	15-18	24-39	< 1975	210 - 300	
	14d	12-15	12-30			
	14e	9-12	9-30			
	15c	15-18	15-40	<2625	120 - 270	
	15d	12-15	12-40	mnt. 5577		
	15e	9-12	9-40			
	15f	6-9	6-15			
	15g	3-6	3- 6			
	16e	9-12	6-15	<sealevel	270	
	17d	12-15	12-25	< 650	230 - 350	
	17e	9-12	9-25			
	17f	6-9	6-15			
	17g	3-6	3- 6			
	18d	12-15	12-35	650-1650	200 - 320	
	18e	9-12	9-35	mnt. 3937		
	18f	6-9	6-15			
	19d	12-15	12-25	< 1975	250 - 365	
	19e	9-12	9-25			
	20d	12-15	12-40	1975-7875	100 - 200	
	20e	9-12	9-40	mnt.12139	<250	
	20f	6-9	6-15			
	21e	9-12	9-20	2625-4600	70 - 140	
	21f	6-9	6-15	mnt. 5900		
	22c	15-18	40-60	1650-7875	30 - 180	
	22d	12-15	12-60	mnt.14100		
	22e	9-12	9-53			
	22f	6-9	6-15			
	23f	6-9	6-14	3950-6900	30 - 140	
	23g	3-6	3- 6			
	26f	6-9	6-15	3950-6575	60 - 130	
	29f	6-9	6-15	1975-5575 mnt. 7874	60 - 200	
	30g	3-6	2- 6	325-3950	<240-320	
	31g	3-6	2- 4	175-650	280 - 350	

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Sitanion jubatum

Alameda County

1. Berkeley Hills. June 1914.

Amador County

1. Old vineyard, Reservoir Hill, old UC Foothill Field Station, 5.3 miles NE of Jackson. May 1957.

Butte County

1. On red sandstone NE of Chico 20 miles. Open ponderosa-oak forest. June 1941.

Calaveras County

1. Mountain Ranch, blue oak woodland. June 1959.

Colusa County

1. Grade about 3 miles W of Leesville in digger pine-oak belt on gravelly slope. Assoc. *Rhamnus* and *Ceanothus*. June 1916.

Contra Costa County

1. Above Port Costa Brick Works, 4 miles W of Martinez on road to Crockett Open slopes. Assoc. *Baccharis*. May 1956.
2. Between the old mining towns of Somersville and Nortonville, 6 miles SW of Antioch. May 1956.

El Dorado County

1. Omo Ranch Post Office. Open yellow pine forest. Elevation 3500 feet. June 1956.
2. Pine Hill Summit, Stony slope with chaparral. Elevation 2059 feet June 1956.

Humboldt County

1. Eel River at Fort Seward at river overflow area. Rocky-sandy soil. June 1951.

Kern County

1. West Kern County, Twisselman Ranch. May 1950.

Lake County

1. South of Lakeport 1.5 miles. Open foothill slopes. June 1955.

Sitanion jubatum continued

Los Angeles County

1. Lancaster. April 1931.

Madera County

1. North of Ahwahee Sanatorium 3.5 miles, near foot of trail to Miami Mountain Lookout. North facing slope in ponderosa pine forest. Elevation 3300 feet. June 1939.

Marin County

1. West-Point-Inn to Bolinas Trail. May 1922.

Mariposa County

1. Guadeloupe mountain, NE of Cathay Valley, along Highway 140. Reddish stony soil, road cut bank. Elevation 2000 feet. June 1956.

Mendocino County

1. Serpentine soil, S pasture. June 1954.

Napa County

1. South shore of Conn Reservoir, Highway 128, 4 miles E of Rutherford. Serpentine soil. May 1954.

Placer County

1. Northern limits of Lincoln. vernal pools in valley grassland. Elevation 160 feet. May 1971.

Plumas County

1. East of Meadow Valley 1.7 miles on the road to Quincy. Moist hallows in rocky ponderosa forest. Assoc. *Pseudotsuga mucronata* and *Libocedrus decurrens*. Elevation 3600 feet. July 1939.

San Benito County

1. Cornwall Ranch, 2 miles W of San Benito. Grassy hills in open stand of *Quercus douglasii*. Elevation 1600 feet. June 1939.
2. Old railroad right-of-way 1 mile N of Tres Pinos. May 1953.

San Bernardino County

1. West of Victorville 3 miles on Route 66. Sandy soil along roadside in Joshua Tree area. April 1942.

San Luis Obispo County

1. North east of Cholame 5.5 miles, Cottonwood Pass Summit, Hwy 41. Assoc. *Haplopappus* and *Eriogonum fasciculatum*. Elevation 2000 feet. June 1942.

Sitanion jubatum continued

San Luis Obispo County continued

2. Northwest of Bradley 6 miles on the road to Jolon. Loose shaley gravel on dry slopes. Valley grassland foothill transition. Elevation 700 feet. June 1963.

Santa Cruz County

1. Big Basin. 1908.

Siskiyou County

1. North of Weed 3 miles along Highway 5. June 1969.
2. East of Grenada 4 miles, Shasta Valley. Damp subalpine plain. Elevation 2850 feet. October 1934.

Solano County

1. North end of Green Valley. Open blue oak woodland. May 1953.
2. Northwest of Rockville 2 miles. White clay soil, creek overflow. Assoc. *Elymus glaucus* and *Sitanion hansenii*. May 1955.
3. West of Winters 4 miles. Sandstone bench, low foothills; digger pine-blue oak-buckbrush woodland. May 1958.
4. Near Rio Vista, railroad junction.

Sonoma County

1. Corner of Wright Road and Highway 12, outskirts of Santa Rosa. Clay loam in open field. Assoc. *Scorzonella procera* and *Pleuropogon*. June 1942.
2. Three miles from Petaluma on I Street. May 1956.

Tehama County

1. West southwest of Paskenta 6 miles. Ridge between Hatch Field and Lake Hallow. Serpentine soil. Elevation 2000 feet. Sheldon Jeffers Ranch. June 1966.

Tulare County

1. East of Badger 5 miles. June 1950.

Yuba County

1. Northeast of the town of Browns Valley 7.5 miles. Road bank, foothills, blue oak woodland. June 1957.
2. West of Brownsville 1 mile. Dry rocky flats. Assoc. ponderosa pine, incense cedar, and *Arctostaphylos*. June 1966.

SPECIES DESCRIPTION AND HABITAT	MLRA 4ETa	4ETa inch	PRECIP inches	ELEVATION (feet)	Frost FREE DAYS	Seed Data
<p><u><i>Sporobolus airoides</i></u> Alkali Sacaton</p> <p>A large tough perennial bunch grass, erect or spreading, 50 to 100 cm tall. Found on alkaline flats from Solano county south through the Central Valley to Southern California, east through the desert and north into the Great Basin to Bishop. Found below 6900 feet. A common element of original California grassland. A good forage for cattle and horses when abundant. This grass produces a coarse and fibrous root system which penetrates the soil to good depths.</p> <p>Collect seed from July to September. May be as early as June in some areas.</p>	14e	9-12	9-30	< 1975	210 - 300	<p><u>1,758,000</u> seeds per pound</p> <p>1 lb/ac = <u>40.4</u> seeds per square foot</p>
	15e	9-12	9-40	< 2625	120 - 270	
	15f	6-9	6-15	mnt. 5577		
	15g	3-6	3- 6			
	16e	9-12	6-15	<sealevel	270	
	17f	6-9	6-15	< 650	230 - 350	
	17g	3-6	3- 6			
	18e	9-12	9-35	650-1650	200 - 320	
	18f	6-9	6-15	mnt. 3937		
	19e	9-12	9-25	< 1975	250 - 365	
	20d	12-15	12-40	1975-7875 mnt.12139	100 - 200 <250	
	29f	6-9	6-15	1975-5575 mnt. 7874	60 - 200	
	30g	3-6	2- 6	325-3950	<240-320	
	31g	3-6	2- 4	175-650	280 - 350	

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Sporobolus airoides

Inyo County

1. Bishop, Alkaline Meadows. 1964.
2. Owen Valley, Lone Pine-Death Valley Highway. 1959.
3. Zabriskie, SE Inyo County. 1948.
4. Olancho, Route. 395. 1942 and 1994.
5. Route 365, 3 miles N of Big Pine.

Kern County

1. Peachtree Road. and Cottonwood Road. 1959.
2. Bukhorn lake, Edwards Air Force Base. 1965.
3. Southeast end of Koehn Lake. 1961.

Merced County

1. Los Banos Wildlife Area. 1948.

Riverside County

1. Riverside and vicinity, 2 miles west of Pelley Station. 1906.
2. Riverside, Pine Street and Brick Yard Riv. 1906.
3. Upper South Fork of Arroyo Terquisquit. 1907.

San Bernardino County

1. Six miles S of Needles. 1942.
2. Between Mojave and Barstow. 1936.
3. San Bernardino Mountain. N side 20 miles from Victorville, Route. 18. 1942.
4. Highway 466 near Barstow. 1950.

Solano County

1. Solano County. 1975.

Santa Barbara County

1. South Pacific Railroad yard. 1958.

Tulare County

1. Vernal Pools, 4.5 miles E NE of Pixley. 1967.

SPECIES DESCRIPTION AND HABITAT	MLRA 4ETa	4ETa inch	PRECIP inches	ELEVATION (feet)	Frost FREE DAYS	Seed Data
<p><u>Stipa cernua</u> Nodding Stipa</p> <p>Similar in most respects to <i>stipa pulchra</i>, differing mostly in the finer blades and flexuous terminal segment of the awn. This species is found in Chaparral, juniper, woodland, and grasslands below 4600 feet.</p> <p>In general, <i>Stipas</i> are well adapted to droughty soils. They green up early in the season and provide much early forage for grazing animals. <i>Stipas</i> require some protection from grazing at the flowering period. Because of the their strong root system, <i>Stipa</i> is valued for erosion control.</p> <p>Collect seed from May to July.</p>	5c 5d	15-18 12-15	23-85 12-68	325-4600 mnt. 8858	60 - 250 60 - 250	<p><u>223,675</u> seeds per pound</p> <p>1 lb/ac = <u>5.1</u> seeds per square foot</p>
	14d 14e	12-15 9-12	12-30 9-30	< 1975	210 - 300	
	15c 15d 15e 15f	15-18 12-15 9-12 6-9	15-40 12-40 9-40 6-15	< 2625 mnt. 5577	120 - 270	
	17d	12-15	12-25	< 650	230 - 350	
	18d 18e	12-15 9-12	12-35 9-35	650-1650 mnt. 3937	200 - 320	
	19d	12-15	12-25	< 1975	250 - 365	
	20d 20e 20f	12-15 9-12 6-9	12-40 9-40 6-15	1975-7875 mnt. 12139	100 - 200 <250	
	29f	6-9	6-15	1975-5575 mnt. 7874	60 - 200	
<p><u>Stipa pulchra</u> Purple Stipa</p> <p>Densely tufted perennial grass, 60-100 cm tall. the foliage is glabrous to finely hairy. This species is found in oak woodland, chaparral, and grasslands. Mostly found in the Coast Range. Found in the Sacramento Valley from Sacramento County north to Tehama County. Found below 4275 feet.</p> <p>Collect seed from May to July.</p>	4b	18-21	36-80	< 2625	250 - 300	<p><u>109,749</u> seeds per pounds</p> <p>1 lb/ac = <u>2.5</u> seeds per square foot</p>
	5b 5c 5d	18-21 15-18 12-15	36-85 23-85 12-68	325-4600 mnt. 8858	60 - 250	
	14c 14d 14e	15-18 12-15 9-12	24-39 12-30 9-30	< 1975	210 - 300	
	15c 15d 15e	15-18 12-15 9-12	15-40 12-40 9-40	< 2625 mnt. 5577	120 - 270	
	17d	12-15	12-25	< 650	230 - 350	
	18d 18e	12-15 9-12	12-35 12-35	650-1650 mnt. 3937	200 - 320	
	19d	12-15	12-25	< 1975	250 - 365	
	20d 20e	12-15 9-12	12-40 9-40	1975-7875 mnt. 2139	100 - 200 <250	

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Stipa cernua

Alameda County

1. Redwood Regional Parks, Berkeley Hills, off Skyline Blvd. June 1958.

Butte County

1. Grade to Paradise. May 1914.

Colusa County

1. Southeast of Leesville 10.7 miles. Road bank, brownish shale soil, open steep slopes. May 1958.

Contra Costa County

1. Near Richmond, coastal bluffs. Assoc. *Melica californica*. April 1941.

Fresno County

1. Near Centerville. On irrigation ditch bank. May 1980.

Glenn County

1. West of Orland 5 miles on the Newville road, gravelly hills. Assoc. *Aristida divaricata* and *Sitanion breviaristatum*. Open slopes, common. May 1914.

Kern County

1. Western Kern County. Twisselman Ranch. May 1950.
2. Northwest Kern County, Avenal Ridge, Cottonwood Canyon, Hwy 41. May 1964.
3. Bodfish, open woods. Elevation 2500 feet. May 1968.
4. East of Poso Mine, 0.25 miles N and above Poso Creek, Greenhorn Mountain. South facing slope rocky outcropping. Elevation 2200 feet. May 1962.

Lake County

1. Clear Lake. June 1940.
2. Found along road from Kelseyville to Lower Lake. 1939.
3. North side of Mount St Helens. May 1939.

Lassen County

1. Susanville. July 1892.

Stipa cernua continued

Los Angeles County

1. Playa Del Rey. Leeward base of sand dune in small tufts. April 1910.
2. Waltheria, Dry N slopes of Palos Verdes Hills. March 1944.
3. South west of Palmdale 10 miles, Route 6. Chaparral assoc. April 1942.
4. Elizabeth Lake Area. April 1951.
5. Santa Catalina Island. Canyon by golf links. March 1928.
6. Santa Rosa Island. June 1888.

Madera County

1. Raymond to Awahee. June 1927.
2. South of Chowchilla 2 miles, 12 miles N of Fresno along Highway 99. April 1942.
3. North of Sharon, Santa Fe Rail Road, 3 miles. Section 13 Township 9S Range 17E. April 1942.
4. South of Madera 10 miles along banks of rail road. April 1942.

Mariposa County

1. North of Mariposa 0.5 miles on Highway 49. April 1949.

Merced County

1. Crocker-Huffman Ranch. April 1942.

Monterey County

1. South of San Lucas, Coastal Range, 3 miles on Highway 101. Salinas River Valley. April 1942.
2. Parkfield. May 1916.
3. East side of the summit of Hog Canyon. Elevation 2500 feet. April 1970.

Riverside County

1. Arroyo Terquisquit at the south end of Chicago Ave. March 1906.
2. South Banning Road to Palm Springs. April 1940.

Sacramento County

1. East of Nimbus 2 miles on Highway 50. Road bank gravel rubble and sand. Assoc. digger pine-oak woodland. April 1958.

San Benito County

1. Road to Idria, 4 miles from Panoche Hall. April 1940.
2. Summit of a ridge, Call Mountains, E of a point 18 miles north of New Idria on road to Panoche. May 1957.
3. North of Pinnacles Post Office 7.5 miles along Highway. Dry grassy slopes, live oak woodland. May 1953.
4. Crest of ridge W of San Juan Bautista on San Juan Grade at Monterey County line. On limestone conglomerate. Elevation 1100 feet. June 1939.

Stipa cernua continued

San Diego County

1. Henshaw Pass. Grassy slopes. May 1930.
2. South of San Diego. April 1942.
3. San Diego County. 1895.

San Luis Obispo County

1. Hills at the summit of Palo Prieta Canyon. Upper Sonora grassland. Elevation 2200 feet. May 1964.
2. South of Chalame 4 miles on road to Simmler. June 1946.
3. Temblor Range 3-4 miles W of Fellows. Elevation 2000 feet. June 1940.
4. Highway between Chalame and Paso Robles. April 1922.
5. Southwest portion of county. Sandy slopes above the Santa Maria River near Taylor Springs. April 1942.
6. Northeast of Chimney Rock 2 miles. Adelaida. Elevation 1050 feet. April 1937.

Santa Barbara County

1. North of Buellton 4 miles on Highway 101. April 1942.

Santa Clara County

1. East of Santa Clara County line 1 mile at the summit of Pacheco Pass. Shaley clay slope in foothill woodland. Elevation 1100 feet. April 1963.

Solano County

1. North end of Green Valley. Oak woodland. May 1953.

Tehama County

1. Between Button Canyon and Diamond Range Road from Red Bluff to Beegum. Rocky canyon slopes. May 1944.
2. Roadside 5 miles N of Red Bluff May 1953.

Ventura County

1. Near Camarillo, El Tio Rancho, on gully slopes. Assoc. *Stipa pulchra*. April 1942.
2. Piru, Newall land and Farming Company. June 1919.

Yolo County

1. West of Winters 4.5 miles on Highway 128 near entrance to Putah Canyon, Vaca Mountains. April 1958.
2. North of Guinda 0.5 miles on Hwy 16, Caypay Valley. Gravelly slopes in low foothills. April 1958.

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Stipa pulchra

Alameda County

1. Holm Ranch, Cedar Mountain. Northeast slope, open oak woodland. Assoc. *Quercus douglasii*. Elevation 2000 feet. May 1939.
2. Tunnel Road, canyon. March 1914.
3. Berkeley hills Behind the University of California. March 1901.
4. Berkeley, Euclid Ave near Keith Ave. Dry hillside. April 1939.
5. Berkeley Campus. 1915.
6. Berkeley hills, Grizzly Peak. March 1935.
7. Berkeley field Campus. June 1920.

Amador County

1. Amador-Sacramento County line, Highway 16. Along dry creek bottom. May 1946.

Calaveras County

1. West of Campo Seco 1.6 miles. Disturbed soil, dry slopes. Assoc. blue oak- manzanita. June 1959.
2. West of San Andreas 3 miles on road to Valley Springs. Thin soil among rocks. April 1930.
3. South west of Copperopolis 6 miles. Open oak woodland. August 1948.
4. South of San Andreas 9 miles on Pool's Station Road. April 1968.

Contra Costa County

1. Near Richmond, coastal bluffs. Assoc. *Melica californica*. April 1941.
2. Sunset Cemetery. March 1914.
3. Between old coal mining towns of Somersville and Nortonville, 6.7 miles SW of Antioch. May 1956.
4. Richmond, east shore and San Pablo Ave. April 1955.

Colusa County

1. Northwest of Ramsey 12 miles on Highway 16, Caypay Valley. Shale slopes in digger pine- blue oak woodland. April 1958.
2. Roadside near Maxwell. April 1942.

El Dorado County

1. North slope, Pine Hill. Elevation 2000 feet. June 1956.

Fresno County

1. New Trimmer Road above W side of Pine Flat Lake, Short distance N of saddle, 1511 foot promontory. May 1953.

Stipa pulchra continued

Humboldt County

1. Along road in Mattole Valley, S of Petrolia. Rocky soil
February 1951.
2. Roadside near Mattole River, Grange Hall, Mattole Valley.

Marin County

1. Stewart Ranch. June 1933.
2. Black Point. Open slopes. April 1940.
3. Kentfield. June 1949.
4. West-Point-Inn to Bolinas Trail, Mount Tamalpais. May 1922.
5. Northeast of Point Reyes Light House 3 miles. Coastal mesa.
April 1954.
6. West of Mill Valley 3 miles. Very abundant on open slopes. May 1941.

Mendocino County

1. South of Willits 3 miles. Meadow grazed by cattle. July 1941.

Monterey County

1. Southeast of Getty 2 miles. Elevation 800 feet. April 1938.
2. Along new road 25 miles S of Monterey. February 1935.
3. Monterey. March 1945.

Napa County

1. West of Aetna Springs. May 1962.
2. Bruno's Place, Crest N of Wooden Valley. Open slopes, oak woodland
May 1956.

Nevada County

1. South of Grass Valley 9 miles. Lime Kiln Road. May 1969.

Orange County

1. East of Santa Ana 8 miles. April 1942.
2. Moulton Ranch, N slope. April 1942.
3. South of Laguna Beach 5 miles on Highway 101. Dry rolling
coastal hills. April 1942.

Placer County

1. Whitney Ranch, 6.8 miles N of Roseville. Valley plains. May 1957.

Sacramento County

1. Elverta N about 0.5 miles along railroad. March 1977.
2. Along the shoulder of the Twin Cities Road. About 3 miles N of Galt.
May 1956.
3. Along railroad 1 mile N of Whiterock. Low non-wooded foothills.
May 1957.

Stipa pulchra continued

Sacramento County continued

4. South of Antelope 1.5 miles. April 1959.
5. North Sacramento County, Rio Linda, Keithley pasture. Elevation 60 feet. April 1934.
6. Uncultivated strip along railroad, about 2 miles E of Rancho Cordova April 1958.

San Diego County

1. South of San Clemente 10 miles on Highway 101, 15 miles N of Oceanside. Sandy field, bluff overlooking ocean. April 1942.
2. Calacortes N of Ramona. April 1940.
3. Del Mar. April 1888.
4. Near Chula Vista. September 1951.
5. North of San Diego 18 miles. Open rolling hills, Roberts Ranch. April 1942.
6. East of Torrey Pines 1.5 miles on road to Miramar. April 1958.

San Francisco County

1. San Francisco. March 1932.

San Luis Obispo County

1. In pasture 7.7 miles from Morro Atascadero Road. April 1929.
2. North of San Luis Obispo 4.5 miles, Highway 101, La Cuesta Pass. April 1964.

San Mateo County

1. Sharp Park, Suburb of Pacifica, Morris point Road, W at Highway 1. June 1962.

Shasta County

1. Near Ingot, Oregon Oak Experimental Plot, Chaparral Belt. May 1942.

Solano County

1. Cordelia, vernal meadow. May 1971.
2. Common along railroad right-of-way. Dozier Station, 11.8 miles S of Dixon. April 1956.
3. Southwest of Dozier Station 2 miles in area with vernal pools. April 1971.
4. North of Allendale, site of old railroad. March 1982.

Sonoma County

1. North of Jenner 2 miles, bluffs above sea. April 1958.
2. South of Healdsburg 3 miles, open woodland, red gravelly soil along Highway 101. May 1957.
3. Sebastopol, Township 6N Range 9W. Elevation 200 feet. April 1934.
4. Northeast of Santa Rosa 10.2 miles on road to Calistoga. June 1942.

Stipa pulchra continued

Sutter County

1. Southeast of Sutter 6 miles. Moist slough eastern base of Marysville Buttes. April 1945.

Tehama County

1. West of Red Bluff 10 miles. Open oak woodland. May 1942.
2. North of Redding 3 miles. Blue oak-grassy hills. April 1916.

Tuolumne County

1. Bald Mountain, 3 miles NE of Sonora. June 1957.

Ventura County

1. Thousand Oaks, south side of Ventura Blvd. Open rocky grassland. April 1959.
2. Near Camarillo, El Tio Rancho, Gully slopes. Assoc *Stipa cernua*. April 1942.

Yolo County

1. West of Winters 3 miles, entrance to Putah Creek Canyon. March 1944.
2. North of Davis 3 miles, east side of Highway 99. July 1944.
3. Northeast of Davis 3 miles, Davis City Dump And Rifle Range. April 1977.
4. North of Davis 1 mile along Pole line Road. April 1970.
5. Southeast of Davis 4 miles, County Road 106, south of the junction with County Road 35. April 1971.
6. West of Winters 4.5 miles, Highway 128 at entrance to Putah Creek Canyon, Vaca Mountains. April 1958.
7. West of Caypay. Assoc. *Melica californica*. April 1944.

Yuba County

1. East of Stanfield Hill. Sandy-clay soil, foothill flat in open oak-digger pine woodland, some chaparral. June 1957.

SPECIES DESCRIPTION AND HABITAT	MLRA 4ETa	4ETa inch	PRECIP inches	ELEVATION (feet)	Frost FREE DAYS	Seed Data
<u>Stipa lepida</u> Foothill Stipa Densely tufted perennial grass, 60-100 cm tall. The culm is finely pubescent below node and sheaths are somewhat hairy about the throat. Found in open woods, dry hills, and rocky slopes in the Coast Range from San Diego to Humboldt County and in the Sierra foothills from Madera to Shasta county. Found below 5575 feet. Collect seed from May to June.	4b	18-21	36-80	< 2625	250 - 300	320,159* seeds per pound 1 lb/ac = 7.4 seeds per square foot *estimate limited data
	4c	15-18	23-80	mnt. 3937		
	5b	18-21	36-85	325-4600	60 - 250	
	5c	15-18	23-85	mnt. 8858		
	5d	12-15	12-68			
	14c	15-18	24-39	< 1975	210 - 300	
	14d	12-15	12-30			
	14e	9-12	9-30			
	15d	12-15	12-40	< 2625	120 - 270	
	15e	9-12	9-40	mnt. 5577		
<u>Stipa speciosa</u> Desert stipa Densely tufted perennial grass, 30-60 cm tall. A slender bladed grass with once bent awns with long hairs (4-7 mm) at the first segment. Found in the arid and semi-arid deserts, canyons and rocky hills of Southern California below 7220 feet. Early foliage is palatable to livestock. Mature foliage is palatable only to horses. Known to hybridize with: <i>Oryzopsis hymenoides</i> . Collect seed from April to June.	17d	12-15	12-25	< 650	230 - 350	
	18d	12-15	12-35	650-1650	200 - 320	
	19d	12-15	12-25	< 1975	250 - 365	
	20d	12-15	12-40	1975-7875	100 - 200	
	20e	9-12	9-40	mnt. 12139	<250	
	21e	9-12	9-20	2625-4600	70 - 140	
				mnt. 5900		
	14d	12-15	12-30	< 1975	210 - 300	150,000* seeds per pound 1 lb/ac = 3.4 seeds per square foot *estimate limited data
	14e	9-12	9-30			
	15d	12-15	12-40	< 2625	120 - 270	
	15e	9-12	9-40	mnt. 5577		
	15f	6-9	6-15			
	15g	3-6	3- 6			
	18e	12-15	12-35	650-1650	200 - 320	
	19d	12-15	12-25	< 1975	250 - 365	
	19e	9-12	9-25			
	20d	12-15	12-40	1975-7875	100 - 200	
	20e	9-12	9-40	mnt. 12139	<250	
	20f	6-9	6-15			
	22c	15-18	40-60	1650-7875	30 - 180	
	22e	9-12	9-53	mnt. 14100		
	22f	6-9	6-15			
	29f	6-9	6-15	1975-5575	60 - 200	
				mnt. 7874		
	30g	3-6	2- 6	325-3950	<240-320	*estimate limited data
	30h					
	31g	3-6	2- 4	175-650	280 - 350	

The following information is based on specimens from the University of California, Davis, Herbarium. Robbins Hall. This information will provide geographic locations for the species as well as a Historical background of the species. This data is not presented as being all inclusive, but as being representative of the species.

Stipa lepidula

Alameda County

1. Field Campus, Berkeley. June 1920.
2. Southeast of Livermore 7.5 miles, above Arroyo Mocho. Northwest facing slope in open woods of *Quercus kelloggii*. May 1939.
3. Southeast of Claremont Hotel, Berkeley Hills. Found in tufts at hill top. April 1931.

Contra Costa County

1. West of Martinez 2 miles, above Suisun Bay on road to Crockett. Assoc. *Baccharis* on steep slopes.

El Dorado County

1. Northwest of Pine Hill 4 miles and 0.5 miles S of the new Salmon Falls Bridge. Stony, reddish-brown igneous soil. Assoc. *Ceanothus fresnensis* and *Wyethia bolanderi*. May 1958
2. West of Rescue 4 miles. Old chaparral burn. May 1926.

Humboldt County

1. Northwest of Petrolia on rocky roadside of county road, Petrolia to Ferndale. May 1951.
2. Mattole Area, Near Petrolia. April 1956.

Los Angeles County

1. Latigo Canyon, 0.8 miles N of Highway 101, Santa Monica Mountains. June 1957.
2. Mulholland Dr near Beverly Glen Blvd. Assoc. coastal sage. May 1959.

Marin County

1. South of Muir Beach, steep slopes and bluffs above sea. Assoc. coastal brush. June 1957.
2. Road to Lake Lagumilos, in shade. May 1926.
3. Miller Park, 5 miles S of Tomales along Highway 1, east shore of Tomales Bay. May 1961.

Modoc County

1. Modoc County. 1940.

Stipa lepida continued

Napa County

1. Above Capell Creek, N end of Capell Valley. Serpentine soil covered with chaparral and digger pine.
2. East of Rutherford 4 miles. April 1950.
3. Chaparral burn, Howell Mountains, above Wooden Valley. May 1956.

Orange County

1. Highway 101, 5 miles S of Laguna Beach, rolling Dry hills facing ocean, sandy soil. April 1942.
2. Sidewalk in Laguna Beach, El Toro. July 1928.

Riverside County

1. Devore, chaparral covered slopes. April 1946.
2. Near Beaumont, rolling hills among shrub. April 1943.

Sacramento County

1. South of Fair Oaks 1 mile, north slope of American River. Sandy-clay bank along road. Foothill woodland. May 1961.

San Benito County

1. Pinnacles Nat'l Monument. South side of hills, sandy ground among chaparral.
2. Crest of ridge W of San Juan Bautista on San Juan Grade at Monterey County line. Limestone conglomerate. Elevation 1100 feet. June 1939.

San Diego County

1. Southwest of Janul 2.5 miles, Proctor Valley Road. Dry slope. Assoc. Coastal sage plant community. May 1968.
2. Northwest of Potrero 5 miles. Granite sandy roadside. Assoc. chaparral. April 1942.
3. San Diego. April 1894.

San Luis Obispo County

1. North of San Luis Obispo 4.5 miles, Highway 101, La Cuesta Pass. May 1964.
2. Northwest of Templeton 11 miles, Klau Mine area, metamorphosed rock, Cinnabar Mines. May 1964.

San Mateo County

1. Sharp Park, suburb of Pacifica, Mori's Point Road, W of Highway 1. June 1962.

Santa Barbara County

1. Near Hollister overpass, Southern Pacific Railroad, Santa Barbara. May 1955.

Stipa lepida continued

Santa Clara County

1. Stevens Creek. Elevation 700 feet. May 1907.

Solano County

1. Putah Creek Canyon, common under manzanita-chaparral. April 1946.
2. Above Putah Creek, 3.5 miles West of Winters, Pleasant Valley Road. Shaded steep slope, sedimentary clay-gravel. Assoc. digger pine, toyon, buckeye, and manzanita. May 1956.

Sonoma County

1. East of Fort Ross 1.5 miles, large glade in redwood forest. Assoc. *Danthonia californica*. June 1955.
2. West-Point-Inn to Bolinas Trail, Mount Tamalpais. May 1918.
3. Santa Rosa-Calistoga Road. Very dry roadside. May 1918.
4. Northeast of Santa Rosa 10 miles on road to Calistoga. Open oak woodland. June 1942.

Tuolumne County

1. Bald Mountain, 3 miles NE of Sonora. June 1957.

Ventura County

1. China Flat. July 1950.

Yolo County

1. Northwest of Dunnigan 3 miles, on County Road 89. Assoc. oak, digger pine, and chaparral. April 1965.

The following information is based on specimens from the University of California, Davis, Herbarium. Robbins Hall. This information will provide geographic locations for the species as well as a Historical background of the species. This data is not presented as being all inclusive, but as being representative of the species.

Stipa speciosa

Inyo County

1. South of Daylight Summit Pass 0.7 miles. Grapevine Mountains, Death Valley Nat'l Monument. May 1958.
2. Fossil Falls, 2 miles N Little Lake. Elevation 3200 feet. May 1962.
3. West southwest of Bishop, Bishop Creek. Elevation 6800 feet. June 1964.

Kern County

1. Red Rock Canyon. May 13, 1930.
2. Mojave Desert, 5 miles NW Mojave Route 446. April 12, 1941.
3. Tehachapi, about 1 mile W of Summit of grade. June 13, 1939.

Stipa speciosa continued

Kern County continued

4. Head of Spanish Needle Creek. Assoc. Digger pine.
Elevation 4650 feet.
5. South of Bakersfield 15 miles, N slope of Tehachapi Mountains,
Highway 99. April 1942.

Los Angeles County

1. Six miles W Llano. April 24, 1942.
2. Near Elizabeth Lake. April 1950.
3. Foothill Blvd., 13 miles S of Pasadena. Assoc. oak-catus. April 1942.
4. Route 6, 6 miles S of Palmdale. Shrub assoc. April 1942.

Mono County

1. Little Round Valley. Elevation 6700 feet. July 1952.

Riverside County

1. Highway 74, 15.6 miles S of West Palm Desert, San Jacinto Mountains.
May 1958.

San Bernardino County

1. Eight miles W Victorville.
2. Mojave Desert, Mescal Range, 1.5 miles W of Wheaton Springs, Just E
of Mountain Pass Summit. Highway 91-466. Elevation 4200 feet.
3. South of Barstow 9.5 miles, road to Stoddard Well. Rocky Slope
April 1955.
4. South of Aztec Springs 1 mile, Ord Mountain area, 12 miles S of Dagget.
April 1955.

San Diego County

1. Head of Box Canyon, near Mason Valley. May 1932.
2. Route 80, 1 mile W of Jacumba. Assoc. chaparral. April 1942.

San Luis Obispo County

1. Northeast corner of county, near Kern County border. East of
Cottonwood Pass on Highway 41. Elevation 2000 feet. Assoc.
Eriogonum and juniper. May 1964.

Santa Barbara County

1. Ballinger Canyon, about 0.5 miles E of Route 33. Sandy flat.
Elevation 2800 feet. May 1965.

Tulare County

1. Cherry Hill Road, 0.3 miles above Kern Canyon Road.
Elevation 4000 feet. May 1967.

BIBLIOGRAPHY

1. Land Resource Regions and Major Land Areas of The United States. December 1981. Agriculture Land Service, USDA. Washington D.C.
2. Hickman, James C. (Editor). The Jepson Manual, Higher Plants of California. 1993. University of California Press, Berkeley and Los Angeles California.
3. Crampton, Beecher. 1974. Grasses in California. University of California Press, Berkeley and Los Angeles California.
4. Hitchcock, A. S., revised by Agnes Chase. 1950. Manual of the Grasses of the United States. Dover Publications, Inc. New York.
5. Climate in Relation to Capability Class and Subclass. February 1970. U.S. Department of Agriculture, Soil Conservation Service. Berkeley California.
6. Rules for Testing Seed. Association of Official Seed Analysts. Journal of Seed Technology, vol. 6, number 2, 1986.
7. Seed Testing Regulations, U.S. Department of Agriculture, Agriculture Marketing Services. Part 201 - Federal Seed Act Regulations, August 1975.
8. Miro, N. T. and J. K. Kraebel. May 1939. Collecting and handling Seeds of Wild Plants. U.S. Department of Agriculture, Forest Service. U.S Forest Service Publication No. 5.
9. Schwendiman, John L. and R. F. Sackman. June 1940. Processing Seed of Grass and Other Plants to Remove Awns and Appendages. U.S. Department of Agriculture. Circular No. 558.
10. Slayback, Robert. February 1975. Standard Rates for Conservation Seedings and Plantings in California. U.S. Department of Agriculture, Soil Conservation Service, California. Technical Note TN - Plant Materials - 5.
11. Stefferud, Alfred (Editor). 1948. Grass, Yearbook of Agriculture. U.S. Department of Agriculture. U.S. Government Printing Press, Washington D.C.
12. S&S Seeds Guidelines for Seed Specifications. S&S Seed Company. P.O. Box 1275, Carpinteria, CA 93013.
13. Bishop, Gene. 1993-1995. Data collected from the University of California, Davis. Herbarium, Robbins Hall. (Unpublished)

BIBLIOGRAPHY

14. Slayback, Robert. March 1994. PLS - What Is It and How Can It Be Used. U.S Department of Agriculture, Soil Conservation, Technical Note TN - Plant Materials - 34.
15. Bishop, Gene. May 1994. Seeding Rates and Germination of Selected Species. U.S. Department of Agriculture, Natural Resources Conservation Service, California. Technical Note TN - Plant Materials - 37.
16. Cronquist, A., A. Holmgren, N. H. Holmgren, J. L. Reveal, and P. K. Holmgren. 1977. Intermountain Flora. Vascular Plants of the Intermountain West, USA, Volume Six. Columbia University Press, New York.
17. Notes on National Forest Range Plants, Part 1, Grasses. 1914. Office of Grazing Studies, U.S. Department of Agriculture, Forest Service. Washington D.C.
18. Bishop, Gene. November 1995. Seed data collected from California Department of Food and Agriculture, California State Seed Laboratory. Sacramento, California. (Unpublished)
19. Parker, Robert, Richard D. Lee, Burrell E. Nelson, David W. Cudney, Larry C. Burrill, Tom D. Whitson, Steven A. Dewey. 1992. Weeds of the West. The Western Society of Weed Science, Newark California. Pioneer of Jackson Hole, 132 West Gill St, Jackson, Wyoming 83001.
20. Plants, A Taxonomic Listing Report. 1994. U.S. Department of Agriculture, Natural Resources Conservation Service. National Plant Data Collection Center, Southern University. Baton Rouge, LA 70874-4490.
21. Munz, Philip A. and David D. Keck. 1975. A California Flora. University of California Press, Berkeley, Los Angeles, and London.
22. Pohl, Richard W. 1968. How To Know The Grasses. Wm. C. Brown Company Publishers, Dubuque, Iowa.

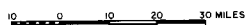
MAPS

MAJOR LAND RESOURCE AREAS WITH 4 ET_a ZONES

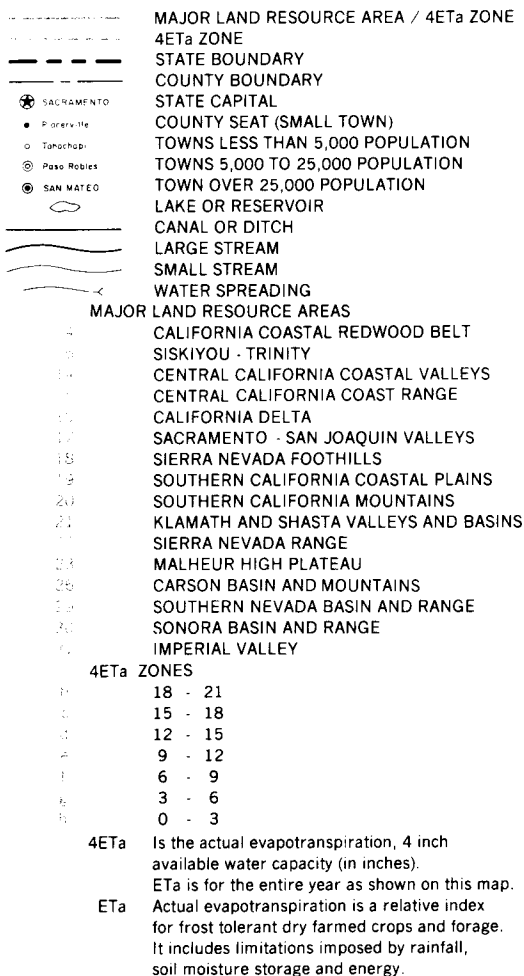
NORTHERN HALF

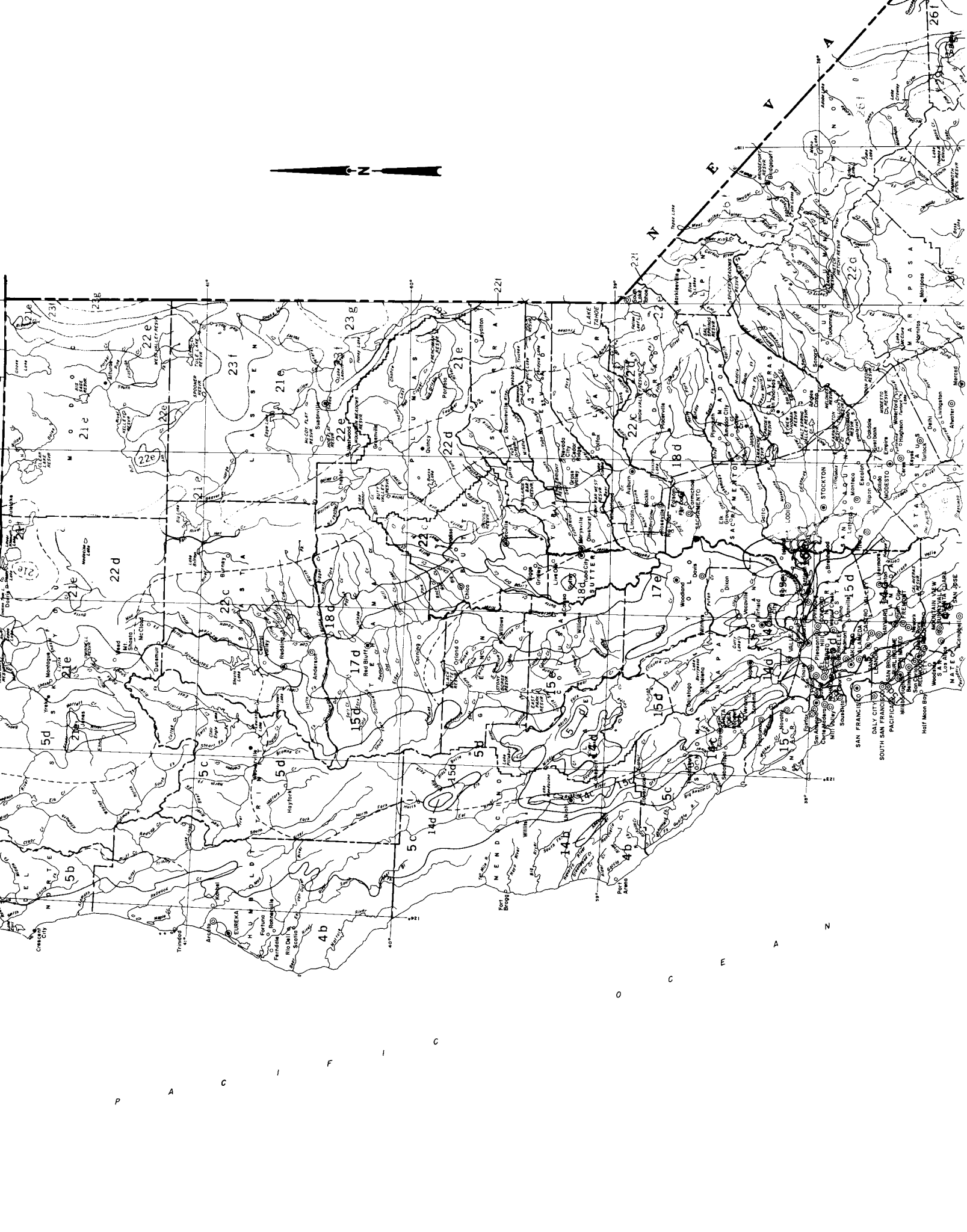
CALIFORNIA

MAJOR LAND RESOURCE AREAS WITH 4ETa ZONES



LEGEND





SOUTHERN HALF CALIFORNIA

MAJOR LAND RESOURCE AREAS WITH 4ETa ZONES

10 0 10 20 30 MILES

LEGEND

	MAJOR LAND RESOURCE AREA / 4ETa ZONE
	4ETa ZONE
---	STATE BOUNDARY
---	COUNTY BOUNDARY
★	SACRAMENTO
●	Placerville
○	Tahoe City
⊙	Poso Robles
⊙	SAN MATEO
○	LAKE OR RESERVOIR
---	CANAL OR DITCH
---	LARGE STREAM
---	SMALL STREAM
---	WATER SPREADING

MAJOR LAND RESOURCE AREAS

1	CALIFORNIA COASTAL REDWOOD BELT
2	SISKIYOU - TRINITY
3	CENTRAL CALIFORNIA COASTAL VALLEYS
4	CENTRAL CALIFORNIA COAST RANGE
5	CALIFORNIA DELTA
6	SACRAMENTO - SAN JOAQUIN VALLEYS
7	SIERRA NEVADA FOOTHILLS
8	SOUTHERN CALIFORNIA COASTAL PLAINS
9	SOUTHERN CALIFORNIA MOUNTAINS
10	KLAMATH AND SHASTA VALLEYS AND BASINS
11	SIERRA NEVADA RANGE
12	MALHEUR HIGH PLATEAU
13	CARSON BASIN AND MOUNTAINS
14	SOUTHERN NEVADA BASIN AND RANGE
15	SONORA BASIN AND RANGE
16	IMPERIAL VALLEY

4ETa ZONES

18	18 - 21
15	15 - 18
12	12 - 15
9	9 - 12
6	6 - 9
3	3 - 6
0	0 - 3

4ETa Is the actual evapotranspiration, 4 inch available water capacity (in inches).

ETa is for the entire year as shown on this map.

ETa Actual evapotranspiration is a relative index for frost tolerant dry farmed crops and forage. It includes limitations imposed by rainfall, soil moisture storage and energy.

